Appendix D Traffic Impact Study

D.1 TRAFFIC IMPACT STUDY
D.2 ANALYSIS OF ACCESS REQUIREMENTS FOR PHASE I, DATED DECEMBER 14, 2004

TRAFFIC IMPACT REPORT

VILLAGE GREEN DISTRICT

HEBRON, CONNECTICUT

Prepared for:
Horton Brothers, LLC

Prepared By:

F. A. Hesketh & Associates, Inc.

August 24, 2004

Hesketh

6 Creamery Brook • East Granby, CT 06026

F. A. Hesketh
& Associates, Inc.

August 24, 2004

Mr. Jim Celio
Century 21
27 Main Street
Hebron, CT 06248

RE: Hebron Village
Route 66 – Hebron
Our File: 02225

Dear Mr. Celio:

Pursuant to your request our office has completed a traffic impact analysis and report identifying the potential traffic impact of a proposed zone change of the Horton brothers parcel to the Village Green District Zone and the development of a 365,500 s.f. mixed use development and 123 residential housing units. We are herewith transmitting fourteen (14) copies of that report for submittal to the Town of Hebron. Under separate cover we will provide an additional nine (9) copies of the report for distribution to team members.

We appreciate the opportunity to provide this analysis to you. A representative from our firm will be available to present testimony before local planning agencies at your request. If you require any additional information regarding traffic related items, please do not hesitate to contact our office.

Sincerely,
F.A. Hesketh & Associates, Inc.

Scott F. Hesketh, P.E.
Senior Traffic Engineer

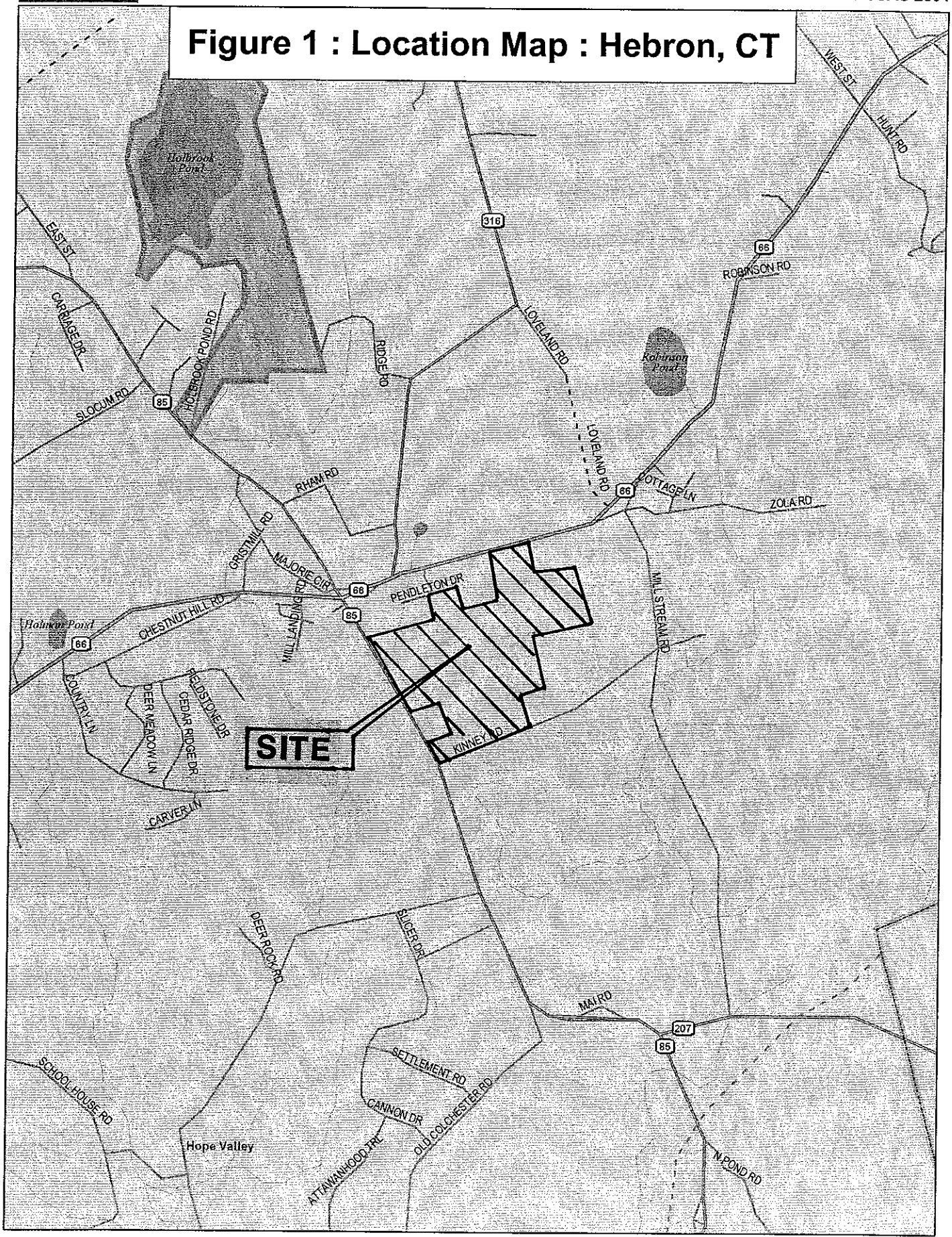
Cc: Mr. Mark Friend

T:\pf\02225\jcel8244.lt1

INTRODUCTION

Horton Brothers, LLC is proposing a mixed-use development for a parcel of land under the Village Green District Zone in Hebron, Connecticut. The property is located on the south side of Route 66 and east of Route 85 with frontage to both roadways. The proposed development includes 356,500 s.f. of floor area comprised of a mix of retail, office, and light industrial spaces as well as 123 residential units and recreational uses. Figure 1 shows the site with respect to the surrounding roadway network. This report documents the findings of a traffic study related to the impact of the proposed development on local and state highways as required for the Master Plan approval under the Hebron zoning regulations for the Village Green District. Since the site has direct frontage and access on state highways Route 66 and Route 85 and proposes over 100,000 s.f. of floor area, a certificate of operation must be obtained from the State Traffic Commission (STC) in addition to local approvals. This report is intended for the submission to local authorities for approvals and for the STC pursuant to the requirements of Section 14-311 of the Connecticut General Statutes, as amended. The report shall not be used for any other purpose.

Figure 1 : Location Map : Hebron, CT



TN
MN (14.7°W)

Scale 1 : 25,000
1" = 2 083 3 ft
Data Zoom 13-0

SITE DESCRIPTION

The proposed development consists of a variety of land uses, buildings, and open space areas. All of the retail and most of the office use buildings are centered on the northwest section of the site and they include a 35,000 s.f. supermarket, 7,500 s.f. of restaurant, 51,000 s.f. of general retail, 133,000 s.f. of office space, including a new Town Hall facility. In addition, this area will also have a 35,000 s.f. fitness center. The retail and office buildings are located around an open market square in the center of the "village" area. Sidewalks, generally located behind the buildings and fronting to the town square, are provided to connect the buildings to the parking areas and to provide safe access for pedestrians. A total of 123 residential units including age restricted detached homes, attached elderly housing units, and single family homes will form communities along the south side of the parcel. A neighborhood park and community building/clubhouse will be located in the central area of the site with small apartment buildings and attached parking areas surrounding it. Recreational soccer and baseball playing fields, and tennis courts will be centrally positioned on the north side of the site. An area west of the fields and is set aside for 75,000 s.f. of light industrial or office use and associated parking. Walking trails for recreational use are proposed through several of the open areas of the site and sidewalks are proposed throughout the site building areas and along the entire length of the streets in order to improve safety for pedestrians and bicyclists. The trails and sidewalks have access to Route 85 at three locations, including near a small parking area for hikers. The sidewalk next to the main entrance boulevard provides pedestrian access to Route 66.

A total of 356,500 s.f. of buildings of mixed-uses and 123 residential units combined with areas of open space and recreational uses is proposed for the site. All of these uses are specified as acceptable uses in the zoning regulations for the Village Green District.

Vehicle access to the site is proposed by way of two new access points, one approaching Route 66 and the other approaching Route 85. The Route 66 entrance will be located opposite the IGA shopping plaza driveway. The Route 66 driveway will provide a minimum of 24 feet of pavement for each direction separated by a raised landscaped median. Further into the site the median will be wider and landscaped while the 24 feet of pavement on either side will remain, providing by-pass capability around left turning traffic in the heavier use retail/office areas. As the roadway continues west through the site to areas of lesser use the median is discontinued and the pavement width narrows, encouraging slower vehicle speeds. At the centrally located park and clubhouse, a roadway extending north through the site will provide access to industrial areas and parking for the proposed athletic fields.

The Route 85 access will be at the location of he existing Kinney Road intersection. Kinney Road will be reconfigured and relocated to approach the proposed site access roadway east of Route 85. It is proposed to maintain the single lane of approach to Route 85. The intersection is proposed to operate under signalized control. A third driveway on Route 85 currently providing access to a small existing 10-vehicle parking lot with direct access only to hiking trails will remain. Due to the small size of the lot and limited access to facilities, this driveway was not considered in the

distribution of site traffic. The two signalized driveways, one on Route 66 and one on Route 85, will be shown to provide adequate access and appropriate geometry for safe operations.

Parking on the site will be provided so that each land use has adequate parking easily accessible to the building or recreational area. Some of the buildings are located with access to larger shared parking areas. In addition, the roadway directly north and south of the market square will provide up to 40 feet of pavement, sufficient for on street parking.

DESCRIPTION OF AREA

Route 66 is a state maintained highway running generally in a northwesterly direction through several town centers from Interstate 691 in Meriden to Route 32 in Willimantic, with access to Interstate 91, Route 9, Route 2, and Route 6. In the area of the site Route 66 is also known as Main Street, and it provides approximately 38 feet of pavement with a single 13 to 15 foot lane and wide shoulder in each direction of travel. Additional turning lanes are provided as necessary. Signals are provided at the intersections with Route 85 and Route 316 in Hebron and further east at Route 87 in Columbia. The speed limit is posted at 35 miles per hour throughout the center of town and 45 miles per hour west of Route 85 and east of the IGA commercial plaza. Land uses in the area include commercial, retail, financial and other service businesses, residential uses, the town green and a church. Continuing east toward Route 87, land uses include single family homes, farms, and a hunting range. Passing is permitted along some portions of Route 66 outside of the town centers.

Route 85 is a state maintained highway that originates at Route 44 in Bolton and extends southerly through Hebron to New London. In the vicinity of the site Route 85 provides 12 foot wide travel lanes and shoulders of varying widths. Land uses in the area are predominantly residential and the Hebron Elementary School is located between Route 66 and Kinney Road. The speed limit along Route 85 is posted at 45 miles per hour in some areas and 50 miles per hour in others. The school zones are posted at 30 miles per hour and the approaches to Route 66 at 35 miles per hour.

Route 316 is a state maintained highway that originates at Route 66 and extends northerly to its terminus at Route 6 in Andover. Route 316 provides approximately 22 feet of pavement width including two 10 ½ foot lanes and shoulders about ½ foot wide. The approach lane at Route 66 widens to 12 feet with a 2 foot wide shoulder. The roadway is posted at 35 miles per hour except near the middle school and high school, where the speed limit is reduced to 25 miles per hour. Uses in the area along Route 316 include the local schools, the Veteran's Memorial Park, single family homes, and some commercial uses located in the vicinity of Route 66.

Route 87 is a state maintained highway that originates at Route 2 in Norwich and extends northerly to Route 6 in Andover. In the vicinity of Route 66 the roadway generally provides approximately 25 to 26 feet of pavement with two 12 foot wide lanes separated by a double yellow centerline. Shoulders vary from about 1 to 2 feet wide. The speed limit posted near the intersection with Route 66 is 35 miles per hour, although further away it increases to 45 miles per hour. At the intersection with Route 66 there is a church, automobile repair shop, small office building, and the town center green for Columbia. Land uses on Route 87 further from the intersection are predominantly single family homes and farms, as well as a school slightly north of Route 66. Passing is permitted along some stretches of Route 87.

Route 207 is a state maintained two lane highway oriented in a generally east/west direction from Route 85 in Lebanon to Route 97 just west of the Willimantic River in Sprague. The highway is approximately 28 to 30 feet wide providing in general

a 12 foot lane for each direction of travel and shoulders of varying widths. In the vicinity of Route 85 the predominant land use is single family homes.

Kinney Road is a town road approximately 19 feet wide with a single yellow centerline. The approach to Route 85 operates under stop sign control. It provides access for the single family homes in the vicinity and the speed limit is posted at 25 miles per hour.

BACKGROUND TRAFFIC

Background traffic is defined as the traffic on the existing roadway network that would exist at the time of the proposed facility's opening even if the development did not take place. Since the development is proposed for staged construction, a design year of 2010 was chosen. The design year is the year in which it anticipated that the facility will be fully constructed and operating normally. The anticipated traffic patterns for the design year are based on the existing traffic patterns.

The State of Connecticut Department of Transportation (ConnDOT) maintains a system of automated traffic counters on state highways and certain other roadways. The ConnDOT counts conducted during July 1999 indicate that Route 66 east of Route 316 carries an Average Daily Traffic volume (ADT) of 11,800 vehicles with peak hour volumes of 861 vehicles and 1,141 vehicles during the a.m. and p.m. peak hours, respectively. Route 85 south of Route 66 carries an ADT of 9,200 vehicles with peak hour volumes of 696 vehicles and 908 vehicles during the a.m. and p.m. peak hours, respectively. Route 316 north of Route 66 carries an ADT of 3,000 vehicles with peak hour volumes of 214 vehicles and 301 vehicles during the a.m. and p.m. peak hours, respectively. Copies of the ConnDOT counts are included in the appendix.

In order to verify and update the ConnDOT data, this office placed automated traffic counters on several local roadways for a period of one week in late November and early December of 2002. The counters were placed on Route 66 west of Loveland Road, Route 85 south of Kinney Road, and Route 316 north of Route 66. The counts

indicate that Route 66 carries an average daily traffic (ADT) volume of 10,254 with peak hour volumes of 728 vehicles during the a.m. peak hour and 976 vehicles during the p.m. peak hour. Saturday volumes were measured at 7,933 vehicles on a daily basis with a peak hour volume of 675 vehicles. Route 85 carries an ADT of 9,651 with an a.m. peak hour volume of 766 vehicles and an afternoon peak hour of 873 vehicles. Saturday volumes were measured at 9,188 vehicles with a peak hour volume of 811 vehicles. Route 316 carried an ADT volume of 4,407 vehicles. Peak hour volumes were measured at 414 vehicles during the a.m. peak hour and 395 for the p.m. peak hour. Saturday volumes were measured at 3,131 vehicles with a peak hour volume of 313 vehicles. The resulting counts are presented in Tables 1, 2 and 3, respectively.

In addition to the automated traffic counts, manual turning movement counts were conducted at several intersections in the vicinity of the site. The intersections counted were Route 66 at Route 85, Route 66 at Route 316, Route 66 at the IGA Plaza driveway, Route 66 at Route 87,Route 85 at Kinney Road and Route 85 at Route 207. The manual turning movement counts were conducted during the morning and afternoon peak commuter hours as well as the Saturday midday peak shopping hours. Copies of the manual turning movement counts are included in the appendix.

All of these counts were utilized to develop volumes for the existing 2004 traffic pattern. A review of the past traffic volumes indicates that the average annual growth rate on Route 66 is under 1% and under 2% on Route 85. These studies are included in the appendix. In addition, it is a rural area with a history of limited growth patterns and no anticipated large developments except for this one. An annual growth rate of

1.5%, for a total of 3%, was applied to the through volumes in front of the site on Routes 66 and 85. The resulting 2004 Existing Traffic volumes are presented in Figures 2, 3, and 4 for the a.m., p.m., and Saturday peak hours, respectively.

The 2010 design year for the study designates the need to grow the traffic volumes from their existing 2004 levels appropriately. The site generated traffic for two approved and partially constructed developments known as Loveland Hills Phase I and Phase II was also added to the existing traffic volumes. Figures 5, 6, and 7 show the resulting 2010 Background Traffic volumes for individual intersection turning movements during the a.m., p.m., and Saturday peak hours.

Table 1
Traffic Volumes
Route 66, west of Loveland Road, Hebron, CT

Time Begin	11/25/2002 Monday			11/26/2002 Tuesday			12/18/2002 Wednesday			12/19/2002 Thursday			11/22/2002 Friday			11/23/2002 Saturday			11/24/2002 Sunday		
	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total
12:00am	23	11	34	27	18	45	34	22	56	46	26	72	29	15	44	56	36	92	43	37	80
1:00	6	2	8	15	7	22	16	16	32	14	13	27	13	19	32	33	16	49	15	22	37
2:00	5	10	15	10	9	19	11	4	15	11	7	18	11	5	16	18	11	29	6	22	28
3:00	8	9	17	11	8	19	8	10	18	6	11	17	9	11	20	13	19	32	7	6	13
4:00	21	32	53	19	28	47	14	29	43	10	24	34	21	25	46	27	22	49	11	11	22
5:00	37	107	144	46	107	153	46	120	166	50	104	154	44	112	156	52	47	99	11	24	35
6:00	156	359	515	169	362	531	143	369	512	143	358	501	139	338	477	69	95	164	39	54	93
7:00	323	398	721	306	422	728	282	410	692	301	392	693	294	379	673	108	146	254	73	83	156
8:00	314	333	647	290	341	631	335	313	648	273	347	620	288	351	639	181	214	395	120	152	272
9:00	300	251	551	287	290	577	256	267	523	240	332	572	233	249	482	237	247	484	182	188	370
10:00	228	274	502	293	272	565	237	256	493	269	255	524	258	243	501	303	304	607	230	224	454
11:00	262	240	502	283	290	573	249	277	526	350	275	625	264	258	522	328	347	675	299	277	576
12:00pm	242	243	485	278	322	600	278	259	537	297	285	582	263	283	546	303	292	595	288	271	559
1:00	250	264	514	286	328	614	297	258	555	282	310	592	255	278	533	283	278	561	294	262	556
2:00	286	332	618	371	408	779	325	302	627	315	327	642	313	349	662	271	270	541	287	242	529
3:00	409	394	803	448	438	886	411	337	748	428	342	770	428	388	816	297	301	598	247	280	527
4:00	472	338	810	543	433	976	522	327	849	491	372	863	503	348	851	301	284	585	243	268	511
5:00	452	345	797	489	407	896	469	353	822	470	344	814	523	337	860	308	252	560	211	240	451
6:00	298	209	507	314	241	555	369	259	628	314	264	578	433	236	669	279	185	464	171	185	356
7:00	185	143	328	198	163	361	212	190	402	219	172	391	218	156	374	124	130	254	128	134	262
8:00	115	101	216	157	124	281	154	130	284	151	123	274	145	114	259	102	121	223	109	103	212
9:00	113	115	228	109	80	189	106	104	210	111	83	194	115	139	254	114	204	318	57	60	117
10:00	64	52	116	79	52	131	90	70	160	60	67	127	100	231	331	85	80	165	33	42	75
11:00	49	21	70	54	22	76	42	33	75	40	41	81	73	67	140	79	61	140	38	25	63
Total	4618	4583	9201	5082	5172	10254	4906	4715	9621	4891	4874	9765	4972	4931	9903	3971	3962	7933	3142	3212	6354

Table 2
Traffic Volumes
Route 85, south of Kinney Road, Hebron, CT

Time Begin	11/26/2002 Tuesday NB	SB	Total	12/18/2002 Wednesday NB	SB	Total	12/19/2002 Thursday NB	SB	Total	11/22/2002 Friday NB	SB	Total	11/23/2002 Saturday NB	SB	Total
12:00am				22	19	41	26	39	65	22	22	44	57	70	127
1:00				10	11	21	5	22	27	5	18	23	28	35	63
2:00				12	5	17	13	9	22	11	4	15	29	11	40
3:00				3	7	10	10	6	16	5	7	12	21	2	23
4:00				33	15	48	27	11	38	36	5	41	52	0	52
5:00				92	55	147	108	61	169	101	33	134	76	14	90
6:00				432	136	568	433	126	559	372	94	466	113	17	130
7:00				583	172	755	566	200	766	585	162	747	174	76	250
8:00				407	237	644	389	216	605	401	210	611	307	157	464
9:00				267	192	459	264	202	466	268	209	477	442	254	696
10:00				227	205	432	279	235	514	268	166	434	565	223	788
11:00				222	227	449	295	284	579	242	220	462	479	332	811
12:00pm				217	237	454	274	238	512	263	237	500	450	333	783
1:00				247	264	511	269	286	555	246	263	509	375	274	649
2:00				279	322	601	316	293	609	270	306	576	380	272	652
3:00	322	459	781	359	416	775	311	408	719	319	432	751	427	245	672
4:00	336	501	837	374	499	873	339	474	813	387	477	864	394	229	623
5:00	306	498	804	311	514	825	342	473	815	362	489	851	268	363	631
6:00	245	347	592	319	389	708	279	360	639	324	360	684	265	295	560
7:00	191	251	442	164	307	471	199	270	469	174	252	426	112	163	275
8:00	106	194	300	125	213	338	88	199	287	147	141	288	134	128	262
9:00	78	170	248	109	171	280	91	141	232	112	160	272	94	134	228
10:00	51	93	144	56	122	178	53	89	142	102	119	221	87	101	188
11:00	32	56	88	36	50	86	35	48	83	66	87	153	57	74	131
Total	1667	2569	4236	4906	4785	9691	5011	4690	9701	5088	4473	9561	5386	3802	9188

H:\hcsdata\02225\counts\route85a.xls

Table 3
Traffic Volumes
Route 316, north of Route 66, Hebron, CT

Time Begin	11/25/2002 Monday			11/26/2002 Tuesday			12/18/2002 Wednesday			12/19/2002 Thursday			11/22/2002 Friday			11/23/2002 Saturday			11/24/2002 Sunday		
	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00am	5	2	7	12	4	16	15	4	19	8	3	11	14	3	17	12	9	21	27	16	43
1:00	3	1	4	8	4	12	2	2	4	3	2	5	3	3	6	12	5	17	13	8	21
2:00	1	1	2	5	0	5	2	1	3	4	1	5	5	1	6	9	7	16	10	5	15
3:00	2	2	4	3	2	5	2	1	3	3	1	4	6	2	8	6	6	12	0	4	4
4:00	2	5	7	1	4	5	2	6	8	2	6	8	2	4	6	2	2	4	4	4	8
5:00	29	31	60	30	35	65	17	24	41	22	29	51	17	30	47	7	12	19	2	5	7
6:00	133	87	220	129	103	232	127	89	216	138	96	234	132	98	230	15	29	44	9	17	26
7:00	204	180	384	197	198	395	221	193	414	213	187	400	210	182	392	43	62	105	26	35	61
8:00	89	146	235	77	135	212	103	147	250	100	144	244	99	124	223	49	90	139	67	86	153
9:00	102	127	229	110	118	228	85	111	196	56	73	129	80	111	191	108	133	241	105	84	189
10:00	86	82	168	108	104	212	86	105	191	91	106	197	83	85	168	120	115	235	103	113	216
11:00	97	101	198	115	120	235	99	92	191	121	126	247	79	84	163	165	148	313	145	151	296
12:00pm	114	84	198	130	120	250	111	108	219	121	94	215	133	118	251	152	110	262	114	93	207
1:00	101	110	211	134	119	253	103	81	184	126	116	242	115	95	210	142	106	248	108	108	216
2:00	142	198	340	169	272	441	137	201	338	155	204	359	132	239	371	122	104	226	102	93	195
3:00	163	191	354	163	176	339	188	234	422	137	200	337	141	197	338	114	99	213	93	92	185
4:00	159	153	312	196	159	355	191	155	346	175	134	309	182	163	345	104	120	224	95	83	178
5:00	172	114	286	198	197	395	181	161	342	185	117	302	224	124	348	119	107	226	80	52	132
6:00	131	103	234	130	100	230	141	132	273	156	115	271	161	120	281	103	65	168	65	57	122
7:00	88	64	152	130	88	218	133	90	223	111	101	212	100	63	163	73	49	122	60	53	113
8:00	74	40	114	83	50	133	101	60	161	86	38	124	56	38	94	43	36	79	36	31	67
9:00	42	31	73	52	34	86	64	42	106	45	38	83	56	33	89	53	27	80	38	21	59
10:00	22	20	42	28	25	53	30	26	56	26	21	47	31	27	58	37	29	66	18	16	34
11:00	17	8	25	18	14	32	21	16	37	16	10	26	27	25	52	29	22	51	14	8	22
Total	1978	1881	3859	2226	2181	4407	2162	2081	4243	2100	1962	4062	2088	1969	4057	1639	1492	3131	1334	1235	2569

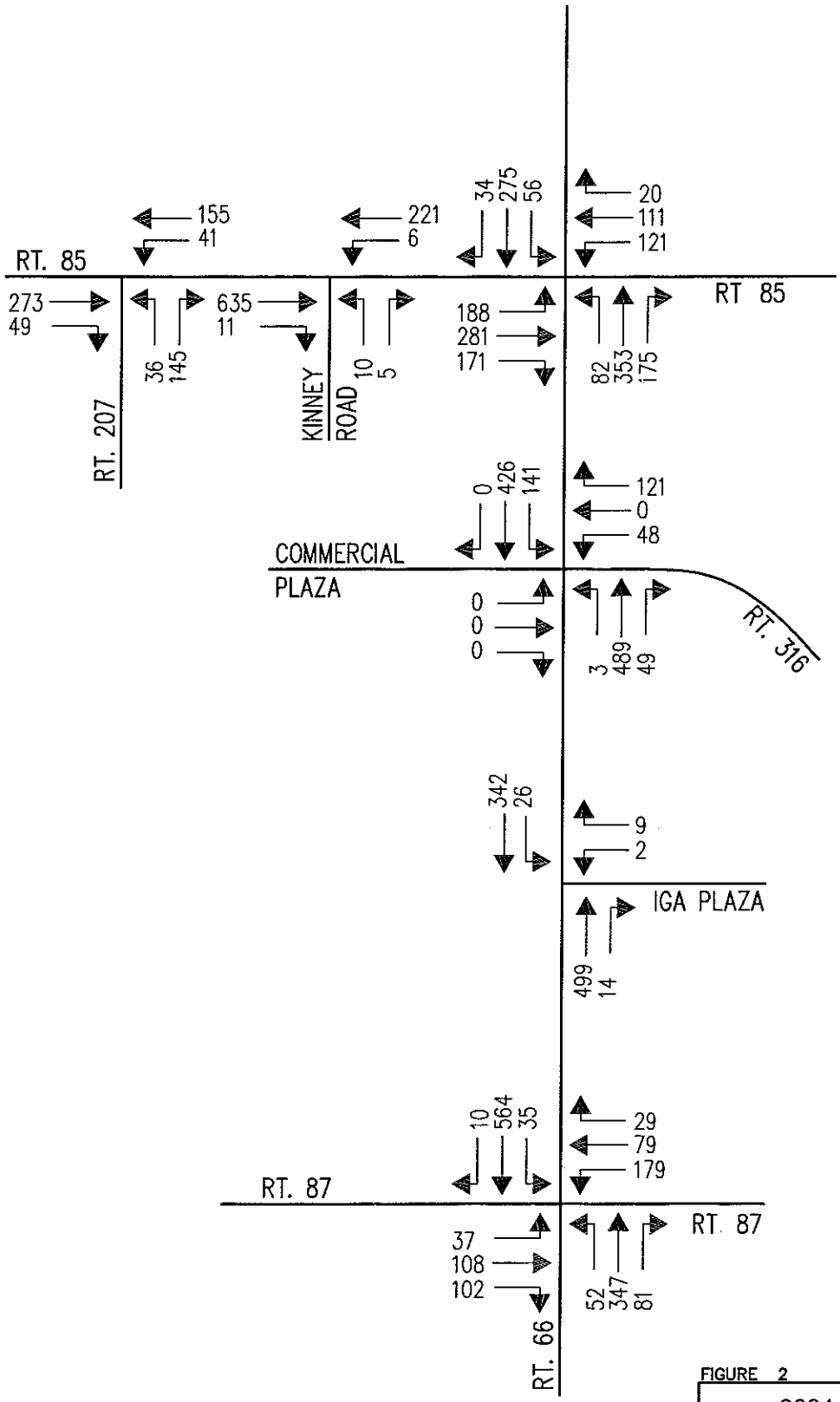


FIGURE 2 8/16/04

2004 EXISTING TRAFFIC
AM PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
8 CREAMERY BROOK, EAST GRANBY, CT 06026
FAH
TRAFFIC
PLANNING
ENGINEERING
DESIGN

NOT TO SCALE

H:\TRAFFIC\MOVEMENT\new\02225MD.dwg, Model, 8/20/2004 11:34:50 AM

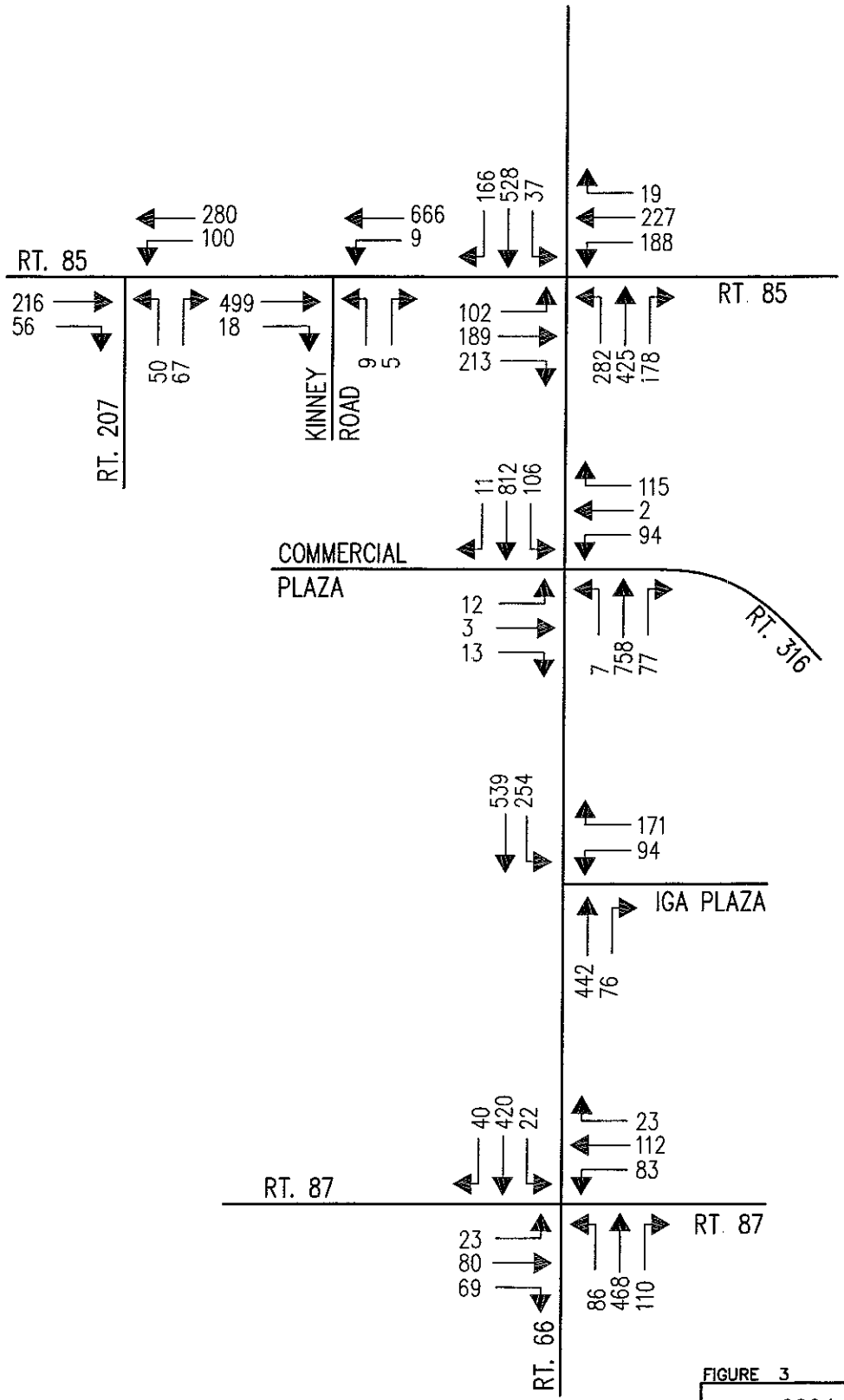


FIGURE 3 8/16/04

2004 EXISTING TRAFFIC
PM PEAK HOUR

HEBRON VILLAGE
ROUTE 66
HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026
FAH
TRAFFIC
PLANNING
ENGINEERING
DESIGN

NOT TO SCALE

H:\TRAFFIC\MOVEMENT\new\02225MD.dwg, Model, 8/20/2004 11:34:59 AM

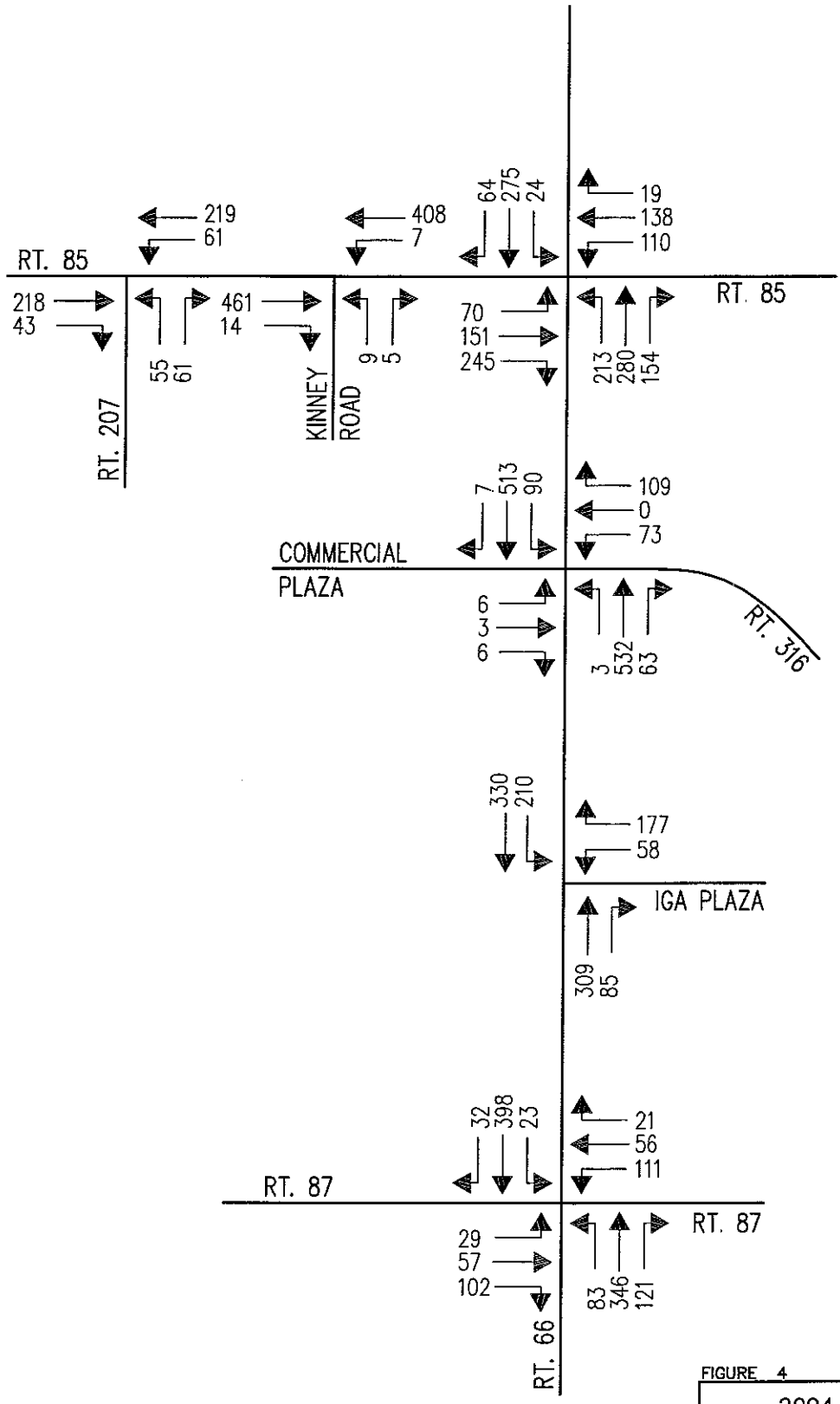


FIGURE 4 8/16/04

2004 EXISTING TRAFFIC
SATURDAY PEAK HOUR

HEBRON VILLAGE
ROUTE 66
HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026
FAH TRAFFIC PLANNING ENGINEERING DESIGN

NOT TO SCALE

H:\TRAFFIC\MOVEMENT\new\02225MD.dwg, Model, 8/20/2004 11:35:09 AM

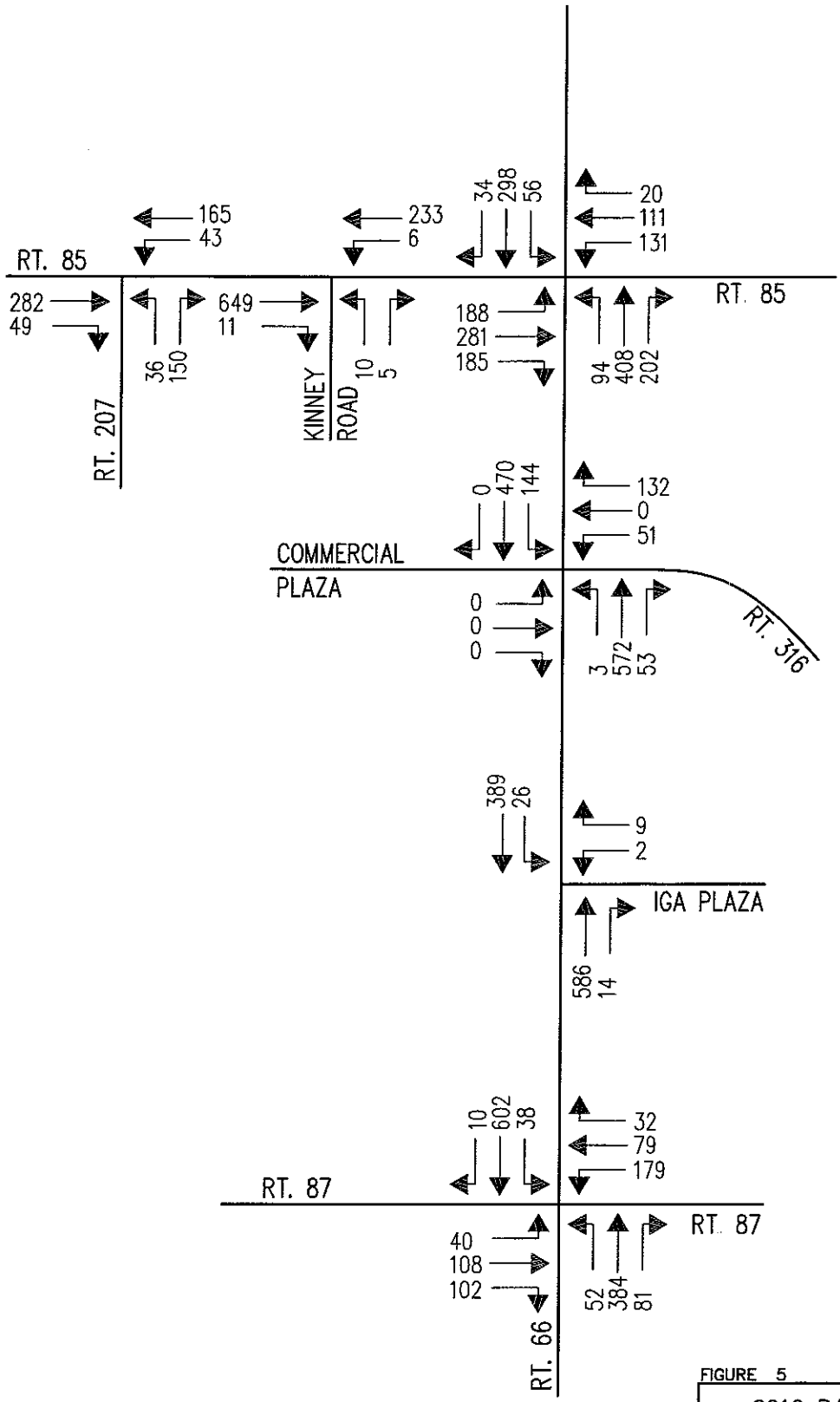


FIGURE 5 8/16/04

2010 BACKGROUND TRAFFIC
AM PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026
FAH TRAFFIC PLANNING ENGINEERING DESIGN

NOT TO SCALE

H:\TRAFFIC\MOVEMENT\new\02225MD.dwg, Model, 8/20/2004 11:35:33 AM

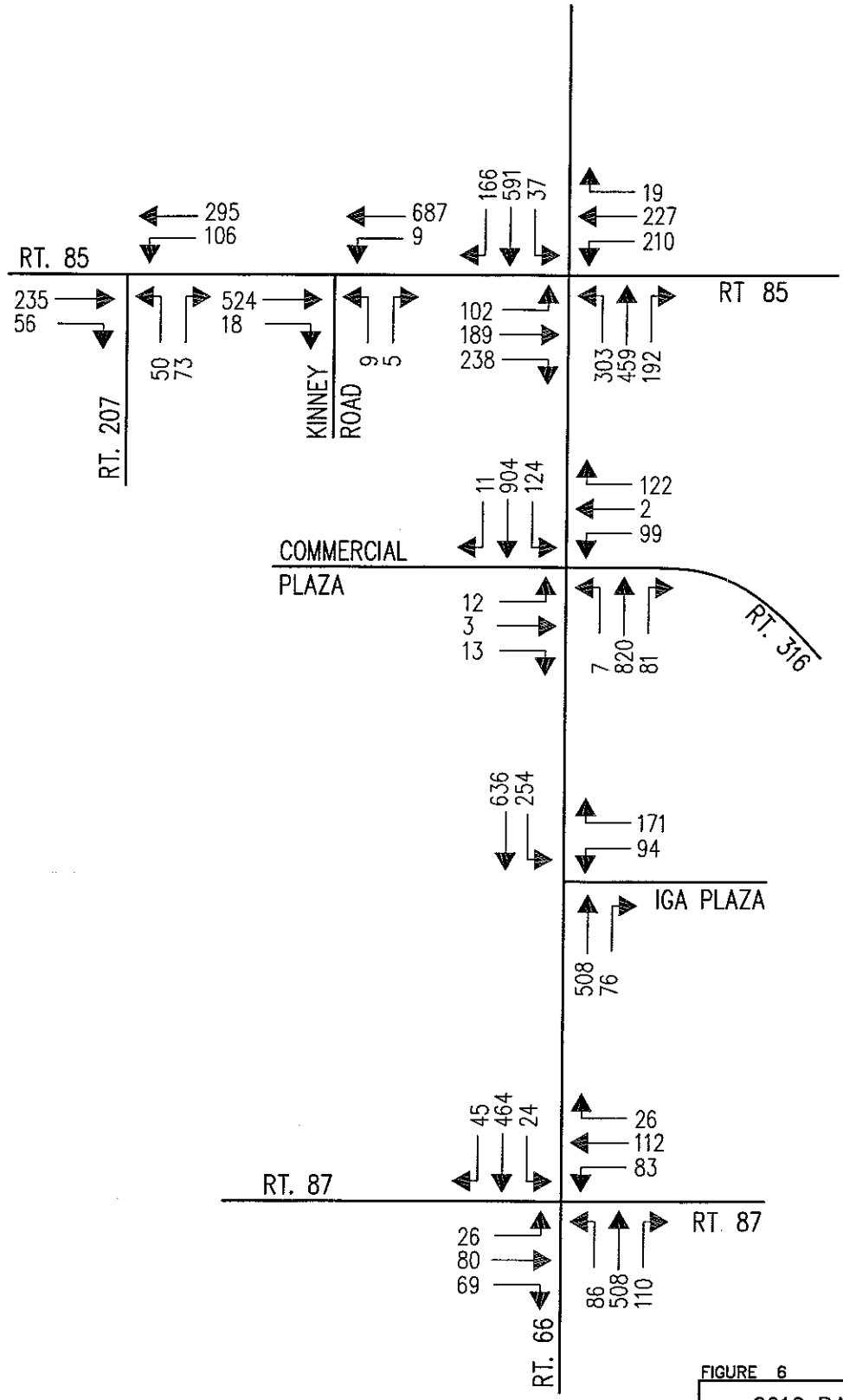


FIGURE 6 8/16/04

2010 BACKGROUND TRAFFIC
PM PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.

6 CREAMERY BROOK, EAST GRANBY, CT 06026

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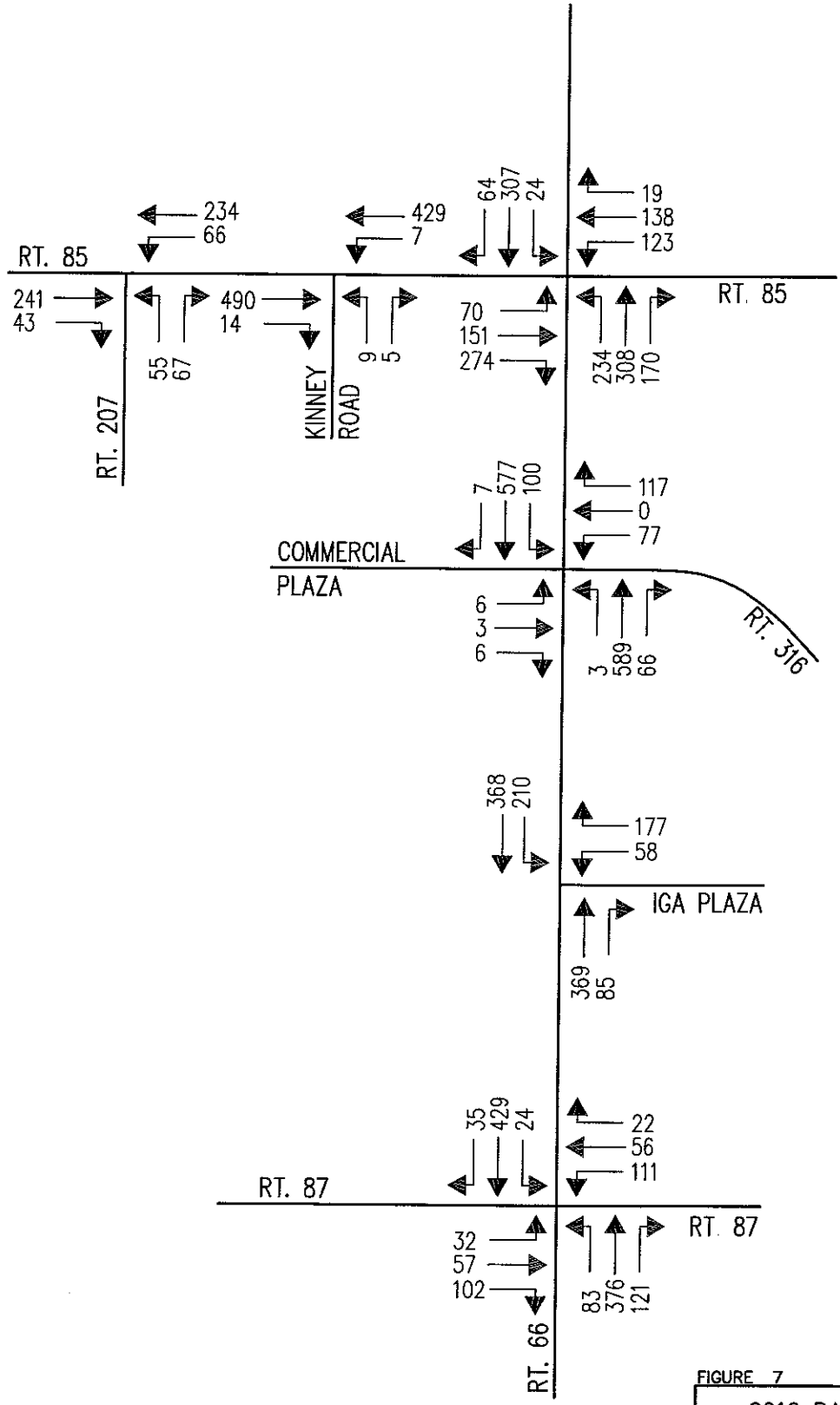

FIGURE 7 8/16/04

2010 BACKGROUND TRAFFIC
SATURDAY PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
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SITE GENERATED TRAFFIC

Estimating the amount of traffic expected at a new land use involves a study to determine the amount of traffic that has been recorded at similar land uses that were constructed in the past and that have operated for a sufficient period of time to have a stabilized and consistent pattern. In 1976, the Institute of Transportation Engineers (ITE) published a compilation of studies gathered from traffic engineers, planners and public officials throughout the country at various land uses. That document, entitled *Trip Generation* was updated several times, most recently in 2003, and provides traffic engineers and planning officials with a single document and guide on trip generation rates for many land uses and building types. The seventh edition (2003) contains considerably more data than all previous editions, with a database of more than 4,250 individual trip generation studies. The report is intended for use in estimating the number of trips that may be generated by a specific building or land use.

Trip Generation utilizes regression equations to compute the 24-hour 2-way volumes and peak hour volumes produced by a given traffic generator. These volumes are then split by ratios representing entering and exiting traffic. Trip Generation was utilized for each of the individual land uses. The traffic generated by the individual uses was computed and the totals added together. The trip generation worksheets are included in the appendix.

Not every visit made to the site is expected to be a separate, unique trip. A primary trip is made for the specific purpose of visiting a particular land use. It is likely

that people already arriving at the site for one use will also utilize other on-site facilities. For example, someone coming to work in the office for the day might get breakfast or lunch at the restaurants and stop at the supermarket at the end of the day before leaving the site, resulting in a single trip for three uses. In order to account for this decrease in outside trips arriving at the site, a multiple use adjustment reduced the site generated traffic by 10% to determine the anticipated driveway volumes as presented in Table 4. Based upon this analysis, we would estimate that the proposed development will generate a total of 670 trips during the a.m. peak hour, made up of 445 entering trips and 225 exiting trips, and a total of 1,278 trips, made up of 562 entering and 716 exiting trips are expected during the p.m. peak hour. The Saturday peak hour volume is projected to be a total of 1,201 trips including 637 entering and 564 exiting trips.

Not all of the site generated traffic will be new to the existing roadway network and can be considered pass-by trips. Pass-by trips are trips made as intermediate stops on their way from an origin to a primary trip destination. Pass-by trips are attracted from traffic passing the site on an adjacent street that provides direct access to the generator. These trips do not require diversion from another roadway and result from traffic that is already passing the site. An example of this type of trip is the stop on the way home from employment to purchase gas and then continuing directly home upon the completion of the purpose. According to ITE, this traffic may be quite high depending on the use and location of the site. Pass-by rates for retail uses have been observed as high as 60% to 70% of the driveway volumes. ConnDOT limits pass-by traffic to a maximum of 20% of the site generated traffic or 10% of the ambient traffic,

whichever is lower. The calculations for pass-by traffic are presented in Table 5. The pass-by traffic is subtracted from the driveway volumes to calculate the new site generated traffic, which is the traffic generated by the development that will be new to the existing roadway network. These volumes are summarized in Table 6.

A gravity model analysis was performed to determine the anticipated trip distribution of the site generated traffic. Data for all towns within 10 miles of the site was utilized in the analysis. This analysis correlates a town's population with the time it would take to drive from that town to the proposed development in order to determine the rate of usage. This analysis is included in the appendix. The resulting distribution is presented in Figure 8, and indicates that 40% of the site generated traffic will originate along Route 66 to the west, 20% along Route 66 to the east, 20% along Route 85 to the south and 10% along Route 85 to the north. The remaining traffic was distributed to the local roadways in general accordance with the gravity model analysis and based on having 70% of the anticipated traffic utilizing the Route 66 access roadway with the remaining 30% utilizing the Route 85 access.

The site generated volumes were then applied to the roadway network following the distribution pattern in Figure 8, resulting in the volumes presented in the Site Generated Traffic Figures 9, 10, and 11 for the a.m., p.m., and Saturday peak hours. This traffic was then added to the appropriate peak hour 2010 Background Traffic in order to determine the 2010 Combined Traffic volumes for the a.m., p.m., and Saturday peak hours as shown in Figures 12, 13, and 14, respectively.

Table 4
Site Generated Traffic
Hebron Village

Land Use	Size	Units	ADT	AM Peak Hour Enter	AM Peak Hour Exit	AM Peak Hour Total	PM Peak Hour Enter	PM Peak Hour Exit	PM Peak Hour Total	Saturday Peak Hour Enter	Saturday Peak Hour Exit	Saturday Peak Hour Total
Office	153,000	s.f.	1,851	232	32	264	43	207	250	28	24	52
General Retail	51,000	s.f.	3,651	52	33	85	161	175	336	242	223	465
Supermarket	35,000	s.f.	3,735	62	40	102	208	199	407	227	219	446
Restaurant	7,500	s.f.	954	45	41	86	50	32	82	94	56	150
Health Club	35,000	s.f.	1,153	18	24	42	72	70	142	46	45	91
Light Industry	75,000	s.f.	523	61	8	69	9	65	74	6	5	11
Residential	123	units	1,258	24	72	96	81	48	129	65	55	120
Total			13,125	494	250	744	624	796	1,420	708	627	1,335
multiple use adjustment (-10%)				-49	-25	-74	-62	-80	-142	-71	-63	-134
Total				**445**	**225**	**670**	**562**	**716**	**1,278**	**637**	**564**	**1,201**

Table 5
Pass-by Traffic Calculations
Hebron Village

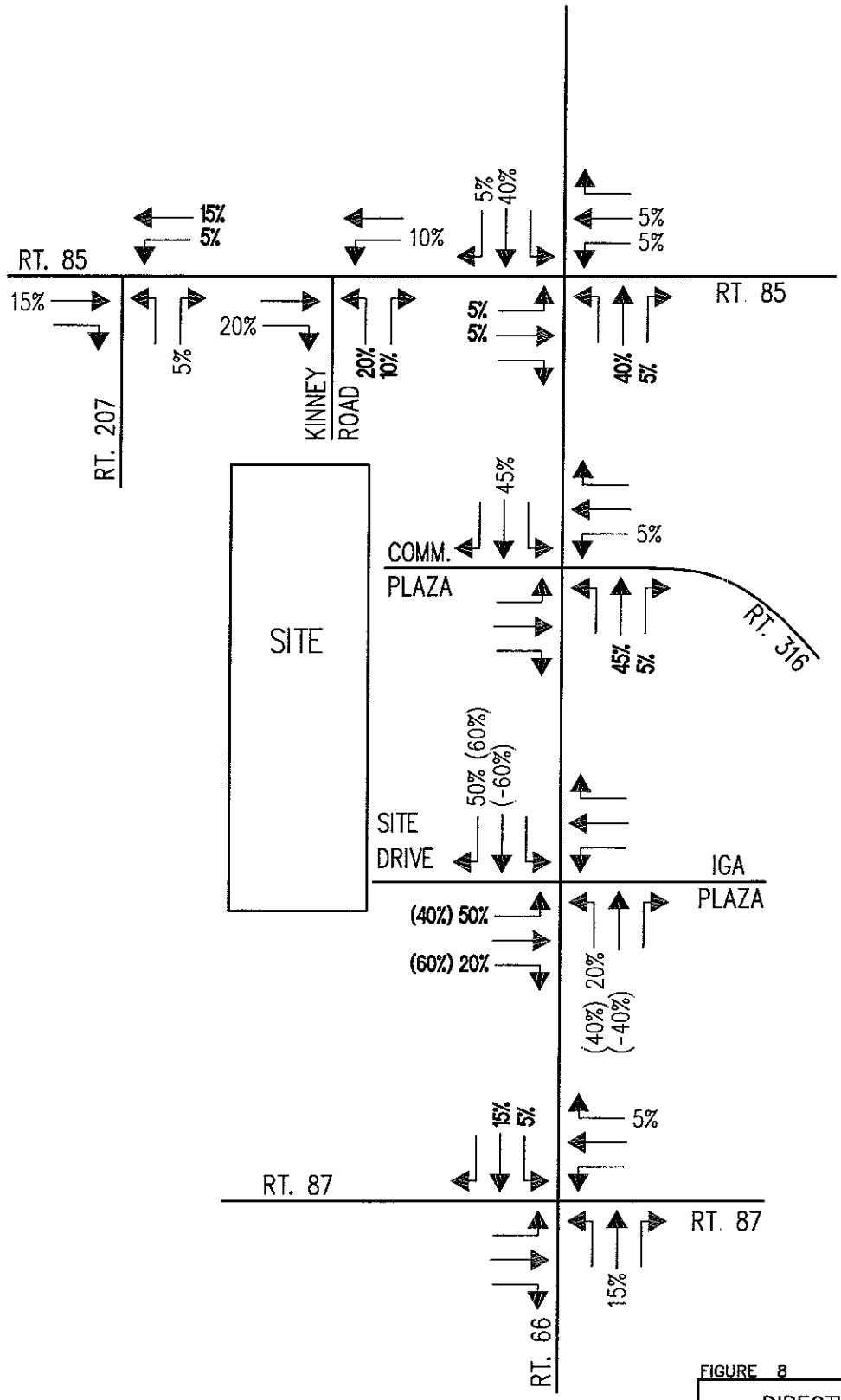
Peak Hour	ambient traffic	Pass-by Traffic enter	exit	total
	calculations based on -10% of ambient traffic volumes			
AM Peak Hour	1,940	-97	-97	-194
PM Peak Hour	2,991	-150	-150	-299
Saturday Peak Hour	2,221	-111	-111	-222

	Pass-by Traffic enter	exit	total
calculations based on -20% of retail generated traffic			
retail generated traffic:			273
	-27	-27	-54
retail generated traffic:			825
	-82	-82	-164
retail generated traffic:			1,061
	-106	-106	-212

Used in this study

Table 6
New Site Generated Traffic
Hebron Village

Traffic Source	AM Peak Hour Enter	AM Peak Hour Exit	AM Peak Hour Total	PM Peak Hour Enter	PM Peak Hour Exit	PM Peak Hour Total	Saturday Peak Hour Enter	Saturday Peak Hour Exit	Saturday Peak Hour Total
Total site generated traffic	445	225	670	562	716	1,278	637	564	1,201
Pass-by traffic	-27	-27	-54	-82	-82	-164	-106	-106	-212
New Site Generated Traffic	**418**	**198**	**616**	**480**	**634**	**1,114**	**531**	**458**	**989**



	ENTER	EXIT
NEW	100%	**100%**
PASS-BY	(100%)	**(100%)**

FIGURE 8 8/16/04

DIRECTIONAL DITSRIBUTION
OF ENTERING AND EXITING TRAFFIC

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

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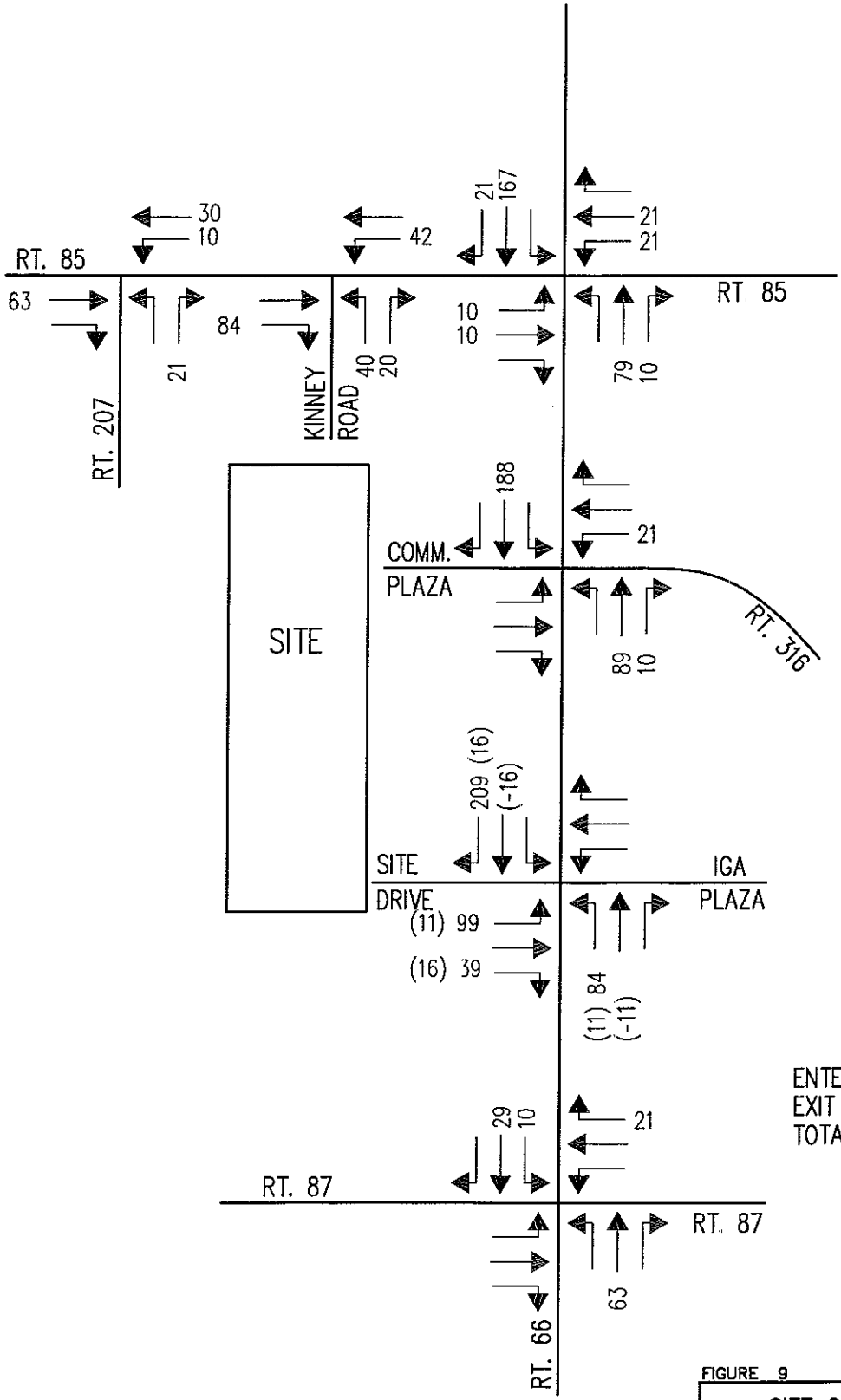

	NEW SITE TRAFFIC	RETAIL PASS-BY TRAFFIC	TOTAL
ENTER	418	(27)	445
EXIT	198	(27)	225
TOTAL	616	(54)	670

FIGURE 9 8/16/04

SITE GENERATED TRAFFIC
AM PEAK HOUR

HEBRON VILLAGE
ROUTE 66
HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026
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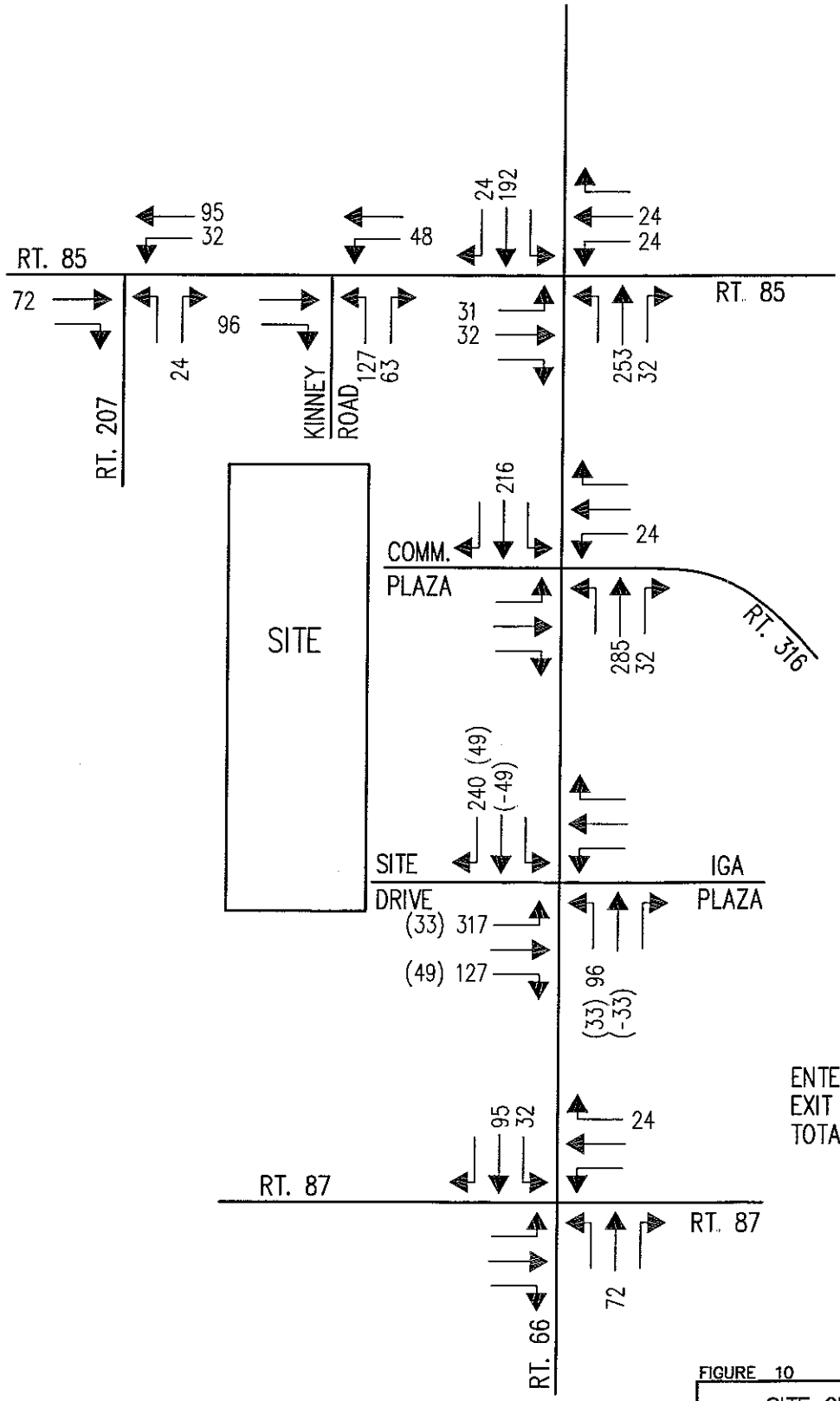

	NEW SITE TRAFFIC	RETAIL PASS-BY TRAFFIC	TOTAL
ENTER	480	(82)	562
EXIT	634	(82)	716
TOTAL	1114	(164)	1278

FIGURE 10 8/16/04

SITE GENERATED TRAFFIC
PM PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026

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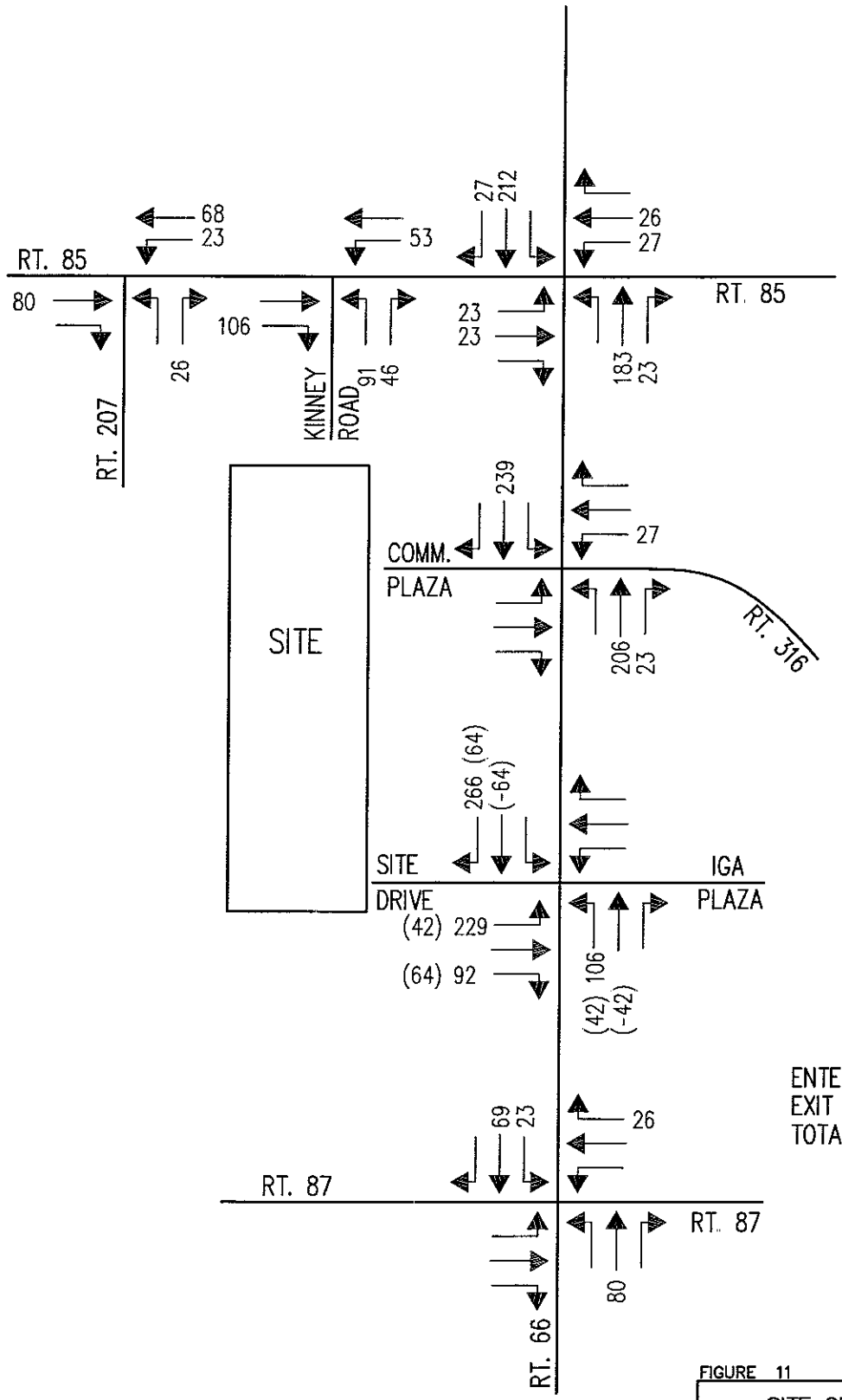

	NEW SITE TRAFFIC	RETAIL PASS-BY TRAFFIC	TOTAL
ENTER	531	(106)	637
EXIT	458	(106)	564
TOTAL	989	(212)	1201

FIGURE 11 8/16/04

SITE GENERATED TRAFFIC
SATURDAY PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026
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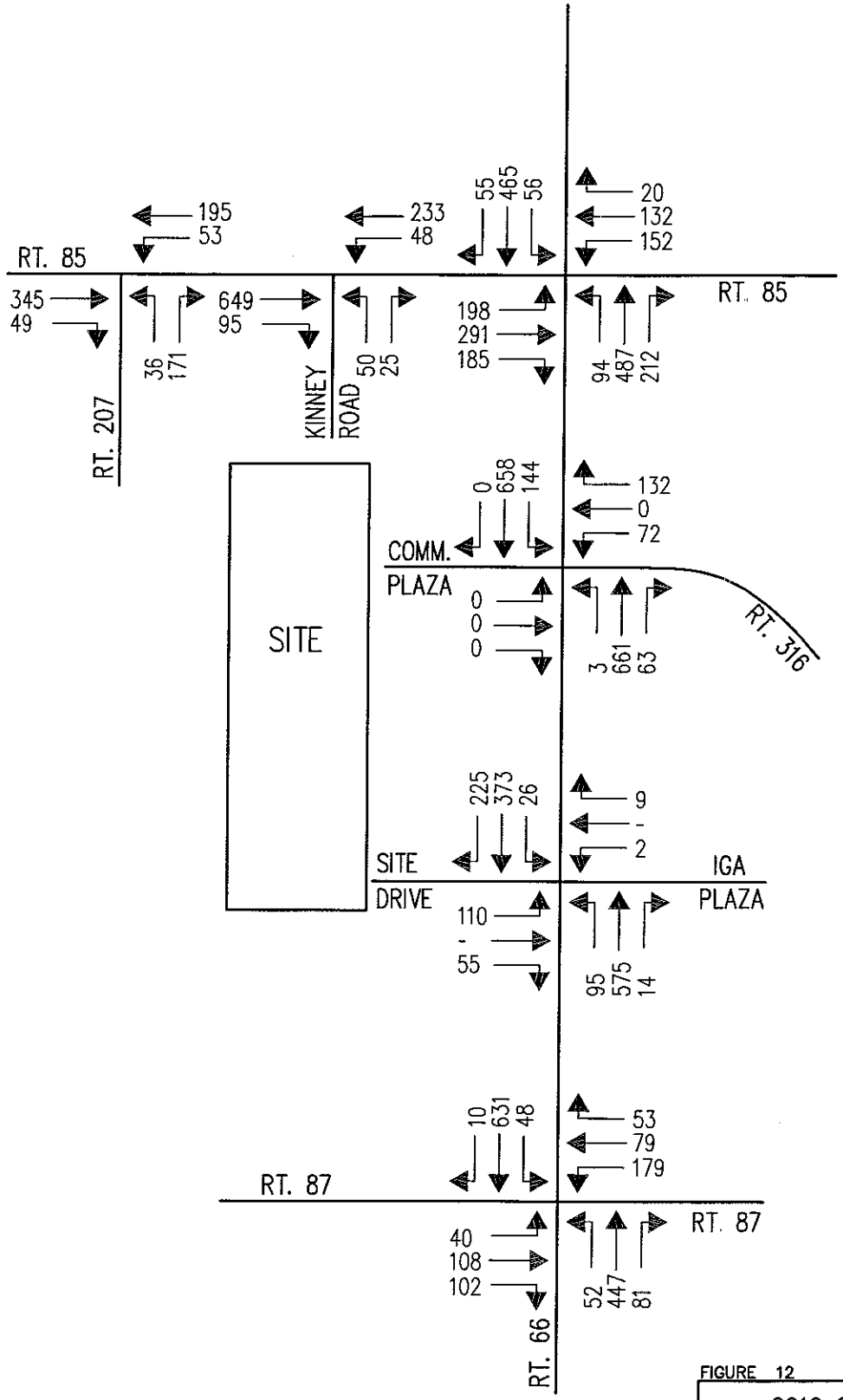

FIGURE 12 8/16/04

2010 COMBINED TRAFFIC
AM PEAK HOUR

HEBRON VILLAGE
ROUTE 66
HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026
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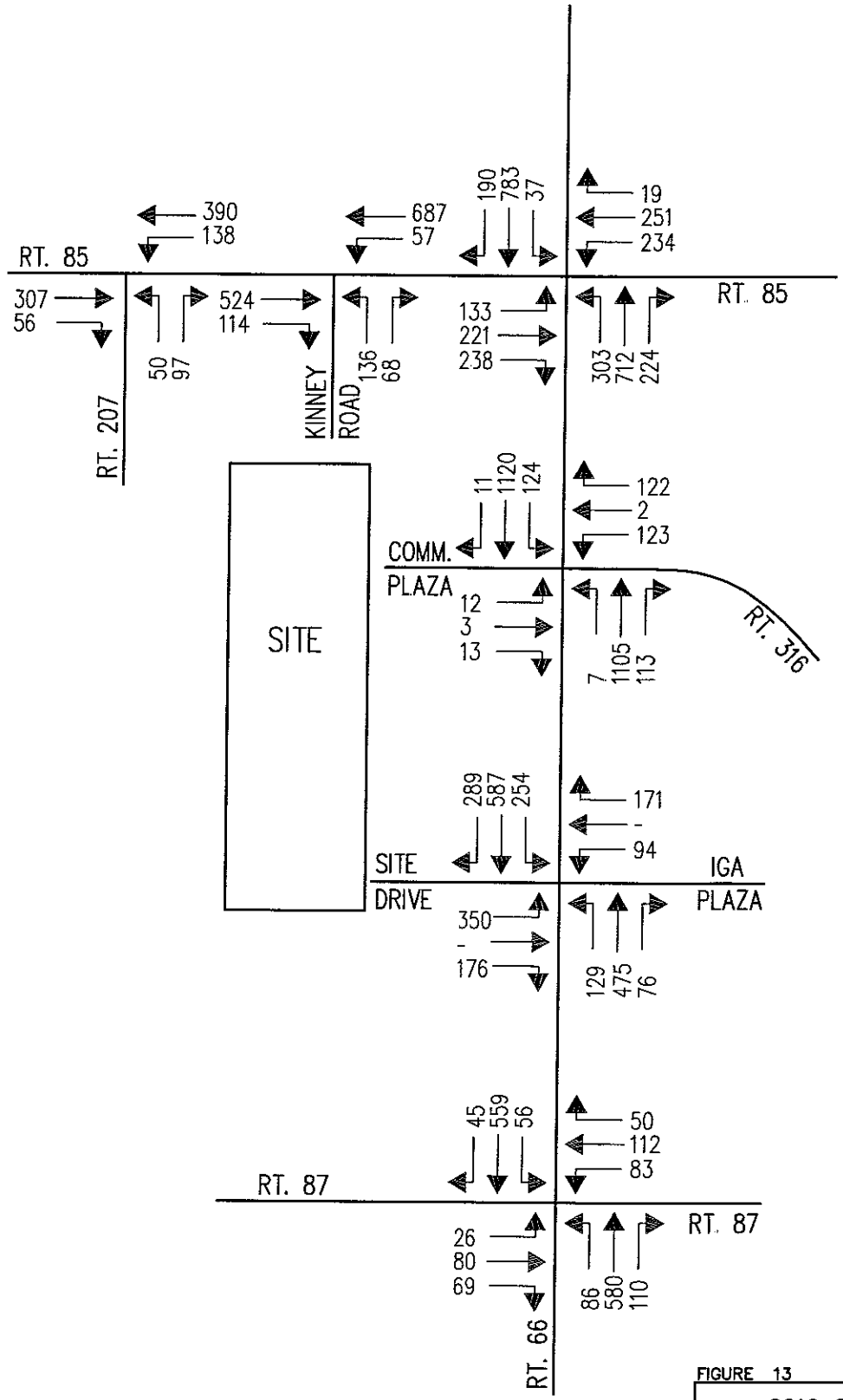

FIGURE 13 8/16/04

2010 COMBINED TRAFFIC
PM PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026
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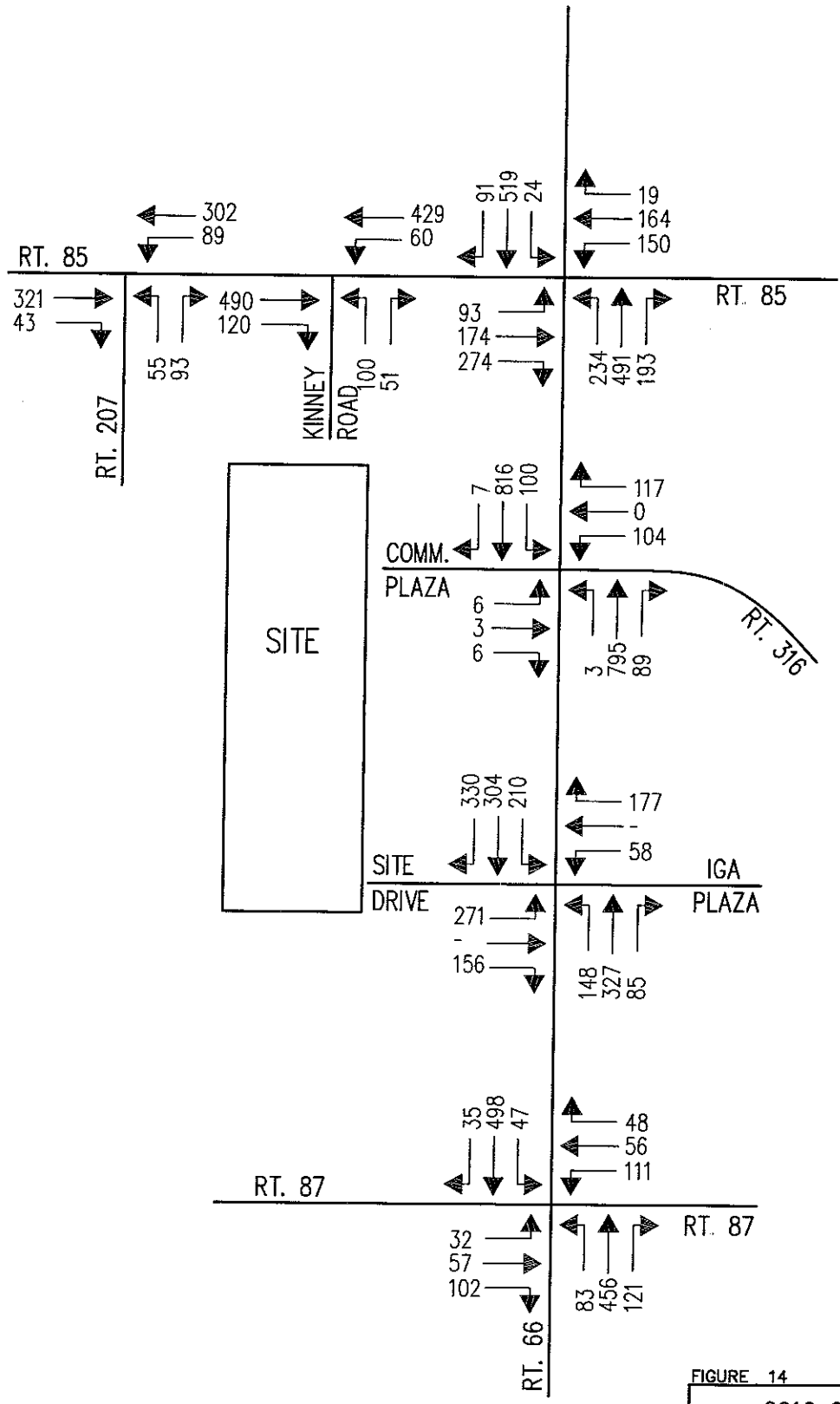

FIGURE 14 8/16/04

2010 COMBINED TRAFFIC
SATURDAY PEAK HOUR

HEBRON VILLAGE

ROUTE 66

HEBRON CONNECTICUT

F. A. Hesketh & Associates, Inc.

6 CREAMERY BROOK, EAST GRANBY, CT 06026

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TRAFFIC IMPACT

In order to determine the traffic impact of the proposed development, capacity analyses were conducted for the 2010 background and combined traffic volume conditions as well as the combined traffic volumes with the proposed improvements. The analyses utilized techniques presented in the "2000 Highway Capacity Manual" (HCM) (Special Report No. 209), published by the Transportation Research Board. These analyses were conducted to determine the operational effectiveness of each of the intersections studied.

For signalized intersections, the total capacity of the intersection is computed on a movement-by-movement basis. This represents the maximum number of vehicles that can utilize the intersection during an hour. A comparison with the total number of vehicles attempting to use the intersection yields the volume-to-capacity ratio (v/c), which is equivalent to the percentage of capacity utilized during the peak hour. As the v/c ratio approaches 1, the intersection nears capacity. A v/c ratio greater than 1 indicates that some cars are unable to proceed through the intersection and will be stored on an approach. In addition, the Level of Service (LOS) is determined for each of the intersections. Level of Service is a measure of the delay time experienced by stopped vehicles at the intersection. Level of Service is rated on a scale from A to F, with Level of Service A representing a delay of less than 10 seconds per vehicle, and Level of Service F representing a delay of more than 80 seconds per vehicle.

The Level of Service criteria for minor street stop controlled intersections are somewhat different from the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. Level of Service is computed for the stopped approaches and for the main street left turns only. Through traffic is considered to have minimal delay. The Level of Service criteria with respect to delay for signalized and unsignalized intersections is shown in the following table:

LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE	SIGNALIZED AVERAGE TOTAL DELAY (SEC/VEH)	UNSIGNALIZED AVERAGE TOTAL DELAY (SEC/VEH)
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The analysis was conducted utilizing the computer analysis program called SYNCHRO, which is based upon the analysis techniques provided in the Highway Capacity Manual. This program is used to analyze intersections on a system wide basis. The results are included in the appendix, summarized in Table 7, and discussed here. The SYNCHRO program automatically computes lane queues as it performs the capacity analysis for signalized intersections. The results are presented in Table 8.

Route 66 at Route 85

This is an existing signalized four way intersection with Route 66 oriented in the east/west direction with Route 85 oriented in the north/south direction. The intersection provides two lanes on each of four approaches consisting of an exclusive left turn lane and a shared through/right turn lane. Results of the analysis for the background traffic volume conditions indicate that a LOS C is provided during the a.m. and Saturday peak hours, and a LOS E is provided during the p.m. peak hour. A review of the analysis indicates that several of the individual movements experience a LOS F with delays of more than 100 seconds and v/c ratios well above 1.0 during the p.m. peak hour.

With the addition of the site generated traffic, the a.m. peak hour will operate at a LOS D, the p.m. peak hour will operate at a LOS E and the Saturday peak hour will operate at a LOS F. The analysis shows that one or more of the individual turning movements during peak hours would experience a LOS F with lengthy delays.

In order to provide for the orderly flow of traffic, improvements are proposed to provide an additional eastbound through lane and an additional westbound though lane. Widening is proposed on the northbound approach to provide an exclusive left turn lane, a single through lane and a dedicated right turn lane. The southbound approach will remain in its current configuration. An analysis of the intersection with these improvements indicates that the a.m. and Saturday peak hours it will operate at a LOS B while the p.m. peak hour will operate at a LOS C.

Route 66 at Route 316

This is an existing signalized intersection with Route 66 oriented in the east/west direction with Route 316 approaching from the north. A minor commercial driveway approaches from the south opposite Route 316. The Route 66 approaches are striped for a single 15 foot wide lane with a 5 foot shoulder on the eastbound approach and a 6 foot shoulder on the westbound approach. Route 316 provides a single lane approach as does the commercial driveway. The analysis indicates that the intersection operates at a LOS B or better during peak hours under the background traffic volume conditions.

An analysis of the combined traffic volume conditions indicates that a LOS B is maintained during the a.m. peak hour and that a LOS C is provided during the Saturday peak hour. However, the p.m. peak hour will operate at a LOS F. In order to offset the impact of the site generated traffic, it is proposed to widen and restripe Route 66 to provide two shared lanes on each approach. An analysis of the combined traffic volumes with the proposed geometry indicates that the intersection will operate at a LOS B or better during peak hours.

Route 66 at the Site Drive

This is an existing unsignalized "T" intersection with Route 66 oriented in the east/west direction and the IGA Shopping Plaza driveway approaching from the north. The Route 66 eastbound approach provides a single through lane and a dedicated left turn lane. The westbound approach is a single lane approach. The IGA driveway provides separate lanes for left and right turning vehicles and operates under stop sign

control. In the background condition all movements will be provided a LOS C or better during the a.m. peak hour. During the p.m. and Saturday peak hours, all movements have a LOS C except for the southbound left turn which experiences high delays and operates at a LOS F.

The proposed site access roadway will be located on the south side of Route 66 opposite the existing IGA. The northbound approach is proposed to provide an exclusive left turn lane and a shared through/right turn lane. The IGA driveway will be restiped to provide a dedicated left turn lane and a shared through/right turn lane. An analysis of the intersection with the combined traffic volumes and the existing geometry operating under stop sign control indicates that left turn movements from both site driveways will operate at a LOS F during peak hours.

Due to the poor level of service a signal warrant analysis was performed for the intersection to see if a traffic signal is warranted at this location. The warrant analyses indicate that a signal is warranted at this location. A detailed discussion of the analysis ~~is presented in a subsequent section of this report.~~ In order to provide for an orderly flow of traffic Route 66 will be widened to provide an exclusive westbound left turn lane and a shared through\right turn lane. The eastbound approach will be widened to provide a dedicated left turn lane, a single through lane and a dedicated right turn lane. An analysis of the intersection operating under signalized control indicates that a LOS B will be provided during the a.m. and Saturday peak hours while the p.m. peak hour will operate at a Los C.

Route 66 at Route 87

This is an existing signalized intersection with Route 66 oriented in the east/west direction with Route 87 oriented in the north/south direction. Although the intersection is striped for all single lane approaches, the eastbound approach on Route 66 is approximately 30 feet wide and the westbound approach is 18 feet wide providing bypass capability for turning vehicles on both approaches. An analysis of the background traffic volume conditions indicates that the intersection operates at LOS C during the a.m. peak hour and at a LOS B during the p.m. and Saturday peak hours. The addition of the site generated traffic does not have a significant impact on the operations or LOS at the intersection.

Route 85 at Kinney Road

This is an existing unsignalized "T" intersection with Route 85 oriented in the north/south direction with Kinney Road approaching from the east. All approaches to this intersection are single lane approaches with the westbound Kinney Road approach operating under stop sign control. An analysis of the intersection under the background traffic volumes indicates that the westbound approach operates at a LOS C during all hours. The southbound left turn movement operates at a LOS A during all hours.

The proposed site plans show that Kinney Road will be relocated and reoriented to intersect with the proposed site access roadway that will intersect with Route 85 at the same location as the existing Kinney Road intersection. With the addition of the site generated traffic, the southbound left turn LOS remains the same, but the

westbound traffic experiences higher delays with LOS D during the a.m. peak hour and LOS F during the p.m. and Saturday peak hours. Due to the poor level of service a signal warrant analysis was performed and a signal is warranted. The warrants are discussed later in this report. In order to provide for an orderly flow of traffic, it is proposed to widen Route 85 to accommodate a southbound left turn lane. An analysis of the intersection under the combined traffic volumes with the proposed geometry indicates that a LOS B or better will be provided at all times.

Route 85 at Route 207

This is an existing unsignalized "T" intersection with Route 85 oriented in the north/south direction with Route 207 approaching from the west. Each approach provides a single lane. An analysis of the background traffic volume conditions indicates that the southbound left turning movement will operate at a LOS A at all times while the westbound leg provides a LOS B during a.m. and Saturday peak hours and a LOS C during the p.m. peak. When the site traffic is added to the intersection, the analysis shows that westbound traffic will operate at a LOS C during peak hours.

The calculated queue lengths at each of the signalized intersections are presented in Table 8. A review of the existing ConnDOT Right of Way plans indicates that sufficient right of way exists at all locations to provide the required queue lengths.

Table 7
Level of Service Summary

Intersection	Peak Hour	2010 Background Traffic LOS	2010 Background Traffic delay	2010 Combined with Improvements LOS	2010 Combined with Improvements delay
Route 66 & Route 85	AM Peak	C	27.1	B	19.1
	PM Peak	E	70.8	C	24.8
	SAT Peak	C	21.7	B	15.9
Route 66 & Route 316	AM Peak	A	9.1	B	11 2
	PM Peak	B	17.9	B	16.7
	SAT Peak	B	10.1	B	11.9
Rt. 66 & Commercial Plaza & Site Drive	AM Peak				
	eastbound left	A	8.9	B	10 6
	southbound left	C	21.4	(signal)	
	southbound right	B	12 7		
	PM Peak				
	eastbound left	B	10.5	C	22 7
	southbound left	F	464.1	(signal)	
	southbound right	C	17.1		
	SAT Peak				
	eastbound left	A	9.4	B	15.1
	southbound left	F	60.8	(signal)	
	southbound right	B	14 4		
Route 85 & Kinney Road	AM Peak				
	westbound	C	17.1	A	5.1
	southbound left	A	0.3	(signal)	
	PM Peak				
	westbound	C	22.5	B	10.0
	southbound left	A	0.3	(signal)	
	SAT Peak				
	westbound	C	16.9	A	8.0
	southbound left	A	0.2	(signal)	
Route 85 & Route 207	AM Peak				
	westbound	B	13.9	C	16.3
	southbound left	A	2.0	A	2 2
	PM Peak				
	westbound	C	17.0	C	24.7
	southbound left	A	2.9	A	3.4
	SAT Peak				
	westbound	B	14 5	C	21 6
	southbound left	A	2.2	A	2.9
Route 66 & Route 87	AM Peak	C	23.2	C	27.2
	PM Peak	B	10 8	B	13.3
	SAT Peak	B	10.3	B	11.7

Table 8
Queue Length Summary

Intersection	2010 Background Traffic AM Peak left / thru / right	2010 Background Traffic PM Peak left / thru / right	2010 Background Traffic Saturday Peak left / thru / right	2010 Combined Traffic AM Peak left / thru / right	2010 Combined Traffic PM Peak left / thru / right	2010 Combined Traffic Saturday Peak left / thru / right
Rt. 66 & Rt. 85						
eastbound	72 / 272 /	37 / 719 /	31 / 314 /	52 / 145 /	40 / 289 /	24 / 198 /
westbound	65 / 468 /	347 / 373 /	153 / 305 /	77 / 327 / 97	221 / 468 / 4	111 / 242 / 25
northbound	153 / 557 /	86 / 476 /	54 / 347 /	104 / 203 / 46	82 / 162 / 54	69 / 143 / 61
southbound	108 / 123 /	233 / 210 /	88 / 128 /	78 / 102 /	168 / 225 /	101 / 141 /
Rt. 66 & Rt. 316						
eastbound	36 / 131 /	43 / 442 /	30 / 190 /	/ 146 /	/ 64 /	/ 148 /
westbound	/ 279 / 13	/ 575 / 16	/ 308 / 17	/ 209 /	/ 270 /	/ 229 /
northbound	/ 0 /	/ 19 /	/ 17 /	/ 0 /	/ 18 /	/ 16 /
southbound	/ 67 /	/ 174 /	/ 110 /	/ 89 /	/ 207 /	/ 144 /
Rt. 66 & Site Drive						
eastbound		n/a		8 / 207 / 70	107 / 236 / 0	120 / 177 / 60
westbound				32 / 290 /	51 / 400 /	75 / 304 /
northbound				82 / 0 /	251 / 55 /	256 / 0 /
southbound				5 / 0 /	63 / 102 /	40 / 0 /
Rt. 85 & Kinney Rd.						
westbound		n/a		42 / /	119 / /	102 / /
northbound				/ 149 /	/ 291 /	/ 279 /
southbound				8 / 42 /	17 / 219 /	16 / 103 /
Rt. 66 & Rt. 87						
eastbound	30 / 396 /	13 / 175 /	16 / 186 /	44 / 425 /	29 / 217 /	26 / 206 /
westbound	64 / 232 /	41 / 254 /	47 / 208 /	64 / 326 /	44 / 298 /	46 / 245 /
northbound	/ 92 /	/ 83 /	/ 67 /	/ 92 /	/ 420 /	/ 73 /
southbound	/ 142 /	/ 137 /	/ 103 /	/ 152 /	/ 420 /	/ 122 /

SIGNAL WARRANT ANALYSIS

Due to poor levels of service and high delays for turning movements at certain intersections, a signal warrant analysis was performed to determine whether traffic conditions would justify the installation of a traffic signal at each of these intersections. These include the intersections of Route 66 with the IGA driveway and the proposed site access roadway as well as Route 85 with the proposed site access roadway. Four of the warrants listed in the Manual on Uniform Traffic Control Devices (MUTCD) are applicable to conditions at these intersections:

1) The "minimum vehicular volume" warrant, which is applied where the volume of intersecting traffic is the principal reason for consideration of installation;

2) The "interruption of continuous traffic" warrant, which applies to operating conditions where the traffic volume on the major street is so heavy that traffic on the minor street suffers excessive delay or hazard in crossing the major street;

3) The "four hour volumes" warrant, which is intended for application when traffic conditions are such that, during peak travel periods, the minor street traffic suffers undue delay in entering or crossing the major street; and

4) The "peak hour volume" warrant, which applies during a single hour, the minor street traffic suffers excessive delay.

The first two warrants are satisfied when, for each of any eight hours of an average day, the minimum traffic volumes specified in the MUTCD are met or exceeded. These minimum volumes apply to the major street (total of both approaches) and to the minor street approach to the intersection. The minimum

volumes are a function of the number of lanes on each approach, the 85-percentile speed of the main road, and the population of the surrounding area. Warrants (3) and (4) are satisfied when the plotted points representing the hourly volume on the major street (total of both approaches) and the corresponding hourly volume on the highest minor street approach lie above the curves shown in the graphs provided in the MUTCD.

In order to do the warrant analyses, the anticipated hourly traffic was determined for each of the intersections. These were based on existing hourly counts and the proposed site traffic distributed throughout the day. The resulting tables are included in the appendix. The four warrant analyses were conducted for each intersection, and these worksheets are also included in the appendix.

The intersection of Route 66 with the proposed site driveway opposite an existing commercial plaza driveway was analyzed. The results indicate that all four warrants are met and the developer proposes to install a signal at this location. In addition, the developer will widen Route 66 in order to provide sufficient pavement width for exclusive turning lanes into the site.

The second site access, located on Route 85 at Kinney Road, was also analyzed. The results indicate that the peak hour warrant and the minimum vehicular volume warrant and the interruption of continuous traffic warrant are met when utilizing the rural warrant volumes. Due to the low levels of service and very high delays experienced by the site traffic at this intersection, as well as the results of the warrant analyses, it is recommended that this intersection be signalized by the developer.

SIGHT LINE ANALYSIS

The Connecticut Department of Transportation has published its requirements for the application of sight distances at intersections and driveways as adopted in December of 2003. In general, the intersection sight distance (ISD) is the available sight distance allowing a driver approaching an intersection to observe the vehicles on the crossing roadway or opposing direction. Basically, the ISD should be sufficiently long for a driver in a fully stopped vehicle at an intersection to complete a turning or crossing maneuver. Therefore, the ISD varies according to the speed of traffic and distance crossed while performing the maneuver. The clear line of sight is measured from a minimum of 15 feet behind the edge of road or traveled way to a point within the road, while the ISD is the line of sight projected along the length of the roadway. The line should be measured at a height of 3 feet 6 inches from the beginning point (driver's eye level) to the end point (object in roadway.) A summary of the guidelines is contained in the appendix.

Our observations at the intersection of Route 66 and the proposed site access roadway indicate that available sight to the east is in excess of 600 feet. This exceeds the current ConnDOT requirement for a design speed of 50 miles per hour. The available sight distance to the west was 390 feet, which meets the ConnDOT requirement for a design speed of 35 miles per hour. It may be necessary to trim back existing tree branches and shrubs that extend into the right of way on the south side of Route 66 nearly to the pavement in order to maintain this sight distance in the future.

The posted speed limit for Route 66 is 35 miles per hour. The existing sight distances for the opposing driveway were observed to be approximately 800 feet to the east and to the traffic signal at Route 316, about 2000 feet to the west. Both distances exceed the requirements for a design speed of 70 miles per hour.

The sight distances along Route 85 at Kinney Road were observed to be 390' to the right, meeting ConnDOT's requirement for a design speed of 35 miles per hour. This is the school zone area with posted speed limit of 30 miles per hour. The sight distance to the left on Route 85 was observed to be approximately 900 feet, exceeding requirements for a design speed of 70 miles per hour.

TRAFFIC ACCIDENT DATA

The Connecticut Department of Transportation gathers and compiles traffic accident data for all state highways and some major local roadways. A list of accidents occurring in the area from January 1st, 1999 through December 31st, 2001 includes the most recent 3 years of available data. In the appendix are the ConnDOT tables relating the accidents to various conditions including date, time, roadway and weather conditions, collision types, and other variables as well as a short description of each accident. Injuries are reported on a scale of A to C, with A injuries necessitating assistance and C injuries listing complaints. Fatalities are indicated separately. The ConnDOT list of applicable abbreviations and definitions for the accident data is also included in the appendix. A 3 year accident history was compiled for each highway within 500 feet of the intersections analyzed in this study. In addition, ConnDOT maintains a Traffic Accident Surveillance Report (TASR), a list that rates sections of roadway on accident occurrence. The methodology used essentially compares the actual recorded accident rate at an intersection to a calculated critical accident rate based on intersection type and quality control. This accident ratio reaches the critical point when those two numbers are equal and the ratio is equal to or greater than 1.0. Also included in that list is a notation for intersections that are on the state's Suggested List of Surveillance Study Sites, or SLOSSS. The most recent available TASR list is based on data collected from 1998 to 2000. The pertinent sections of the list for each highway in the study are included in the appendix.

The area encompassing the intersections of Route 66 with Route 85 and Route 316 contained a total of 39 accidents during the time period reviewed. Although approximately 44 % of those were rear-end collisions, many of the accidents involved vehicles turning or slowing to turn left at one of the two intersections. The TASR indicates that the accident ratios for Route 66 and Route 85 are 1.11 and 0.78, while the ratios for Route 66 and Route 316 are listed as 0.16 and 0.71. Neither intersection is on the SLOSSS. Previous discussion of the capacity of these intersections indicated that roadway widening to provide additional lanes would lessen delay times and increase the levels of service provided. The inclusion of exclusive turning lanes or shared lanes also would allow the safe storage of vehicles queued for certain movements while permitting other traffic to move around them. This is likely to reduce both the number of rear-end accidents occurring due to vehicles stopped for a turning maneuver as well as the number of turning accidents due to insufficient capacity.

The history of accidents for Route 66 in the vicinity of the proposed site driveway is limited to a single incident each year. All three involve one vehicle turning into or out of a driveway into the path of a vehicle going straight on Route 66. The future traffic signal at the site driveway will aid in reducing the possible occurrence of accidents due to the number of anticipated turning movements at the site. The installation of the signal is also likely to reduce the occurrence of similar accidents at unsignalized intersections nearby because the signal will tend to platoon traffic thus providing longer gaps between the platoons for turning maneuvers.

During the 3 years covered in the study, 6 accidents occurred on Route 85 near Kinney Road. On November 15th, 2000, a fatal accident occurred when a vehicle struck a pedestrian crossing the road in the dark approximately 300 feet north of the intersection in the school zone. The remaining 5 accidents were speeding vehicles skidding on wet, slushy, or oil slicked pavement. Two of the incidents happened within 15 minutes of each other on December 20th, 2000 in snowy conditions. The intersection is listed in the TASR as having a low accident ratio of 0.23. There are no specific measures to be taken as a result of the major accident; however, the signalization of the intersection allows the possibility to provide a pedestrian crossing phase to encourage crossing at the intersection.

CONCLUSION AND RECOMMENDATIONS

The proposed development for the Horton property in the Village Green District of Hebron, Connecticut between Route 66 and Route 85 calls for a total of 356,500 s.f. of mixed-use buildings and 123 residential units of various types as well as recreational areas, open wetlands, and hiking paths. The site is expected to generate a total of 942, 1,780, and 1,673 vehicle trips during the a.m., p.m., and Saturday peak hours. Vehicle access to the site will be provided through a main driveway on Route 66 and a second driveway approaching Route 85. A third vehicle driveway on Route 85 will enter a parking lot with only 10 spaces and access to hiking trails.

The developer proposes to signalize and construct additional turning lanes at the two main entrances to the site. In addition, Route 66 will be widened for the area between the intersections with Route 85 and Route 316 in order to provide pavement width for improvements at those intersections. With these proposed improvements, the impact to the existing roadway network is minimized. The site driveways are located appropriately with respect to existing intersections and available sight distances. The internal site design will provide redundant accessibility to heavy use retail areas as well as roadway designs to minimize vehicle speeds. Parking areas for most of the public use areas are shared and located to minimize reducing the village aesthetics while still providing convenient access. The design is in general compliance with the Village Green District zoning regulations pertaining to street and parking standards.

Rec'd @ 12/14/04 p.h.

Hesketh

6 Creamery Brook • East Granby, CT 06026

F. A. Hesketh
& Associates, Inc.

December 14, 2004

Mr. Jim Celio
Century 21
27 Main Street
Hebron, CT 06248

RE: Hebron Village
Route 66 – Hebron
Our File: 02225

Dear Mr. Celio:

Pursuant to your request our office has completed a preliminary analysis of the proposed temporary access requirements for Phase One of the Hebron Village development. It is our understanding that the analysis was requested by the Town Planner to identify the improvements necessary to accommodate the traffic volumes anticipated to be generated by the Phase One portion of the project and to assist the Town in preparing improvement plans for those improvements.

For purposes of this analysis it has been assumed that the Phase One development would consist of the proposed Health Club, 75,000 s.f. of office space, 25,000 s.f. of retail space and 3,250 s.f. of restaurant for a total of 138,250 s f. of floor area. The aforementioned development is anticipated to generate a total of 4,380 trips on a daily basis with peak hour volumes of 259 trips, 476 trips and 424 trips during the a.m., p.m. and Saturday peak hours, respectively. The trip generation estimates are presented in Table 4R.

We have completed an analysis of the intersection of Route 66 with the existing IGA Plaza driveway and the proposed site access roadway. For purposes of the analysis we have assumed that the intersection will be improved to provide exclusive left turn lanes for the eastbound and westbound approaches of Route 66. The site access roadway is proposed to provide a two lane approach. The intersection was assumed to operate under signalized control. Based on these assumptions the intersection will operate at a LOS A during the a.m. peak hour, a LOS C during he p m. peak hour and a LOS B during the Saturday peak hour The capacity analysis results are summarized in Table 7R.

The capacity of a two lane roadway with a 70/30 directional split is approximately 2,500 passenger cars per hour under ideal conditions. The Phase One development is projected to generate a maximum of 476 trips an hour. This volume represents approximately 20% of the roadway capacity. This analysis, however, is not strictly applicable. In order to confirm this, an analysis was

conducted for a hypothetical unsignalized site driveway that intersects the site access roadway immediately south of Route 66. The level of service for all movements at that driveway was determined to be LOS B or better during peak hours. Since the unsignalized driveway operates at LOS B or better it is reasonable to assume that the roadway provides sufficient capacity to accommodate the same traffic volumes. Copies of the capacity analysis worksheets are included in the appendix.

Based on this analysis it is our opinion that the proposed temporary roadway improvements are capable of accommodating the anticipated Phase One traffic volumes, provided that the site access roadway be configured to provide exclusive left turn lanes for the eastbound and westbound approaches and that the intersection operate under signalized control.

We appreciate the opportunity to provide this analysis to you. A representative from our firm will be available to present testimony before local planning agencies at your request. If you require any additional information regarding traffic related items, please do not hesitate to contact our office.

Sincerely,
F.A. Hesketh & Associates, Inc.

Scott F. Hesketh, P.E.
Senior Traffic Engineer

cc: Mr. Mark Friend
Atty Leonard Jacobs

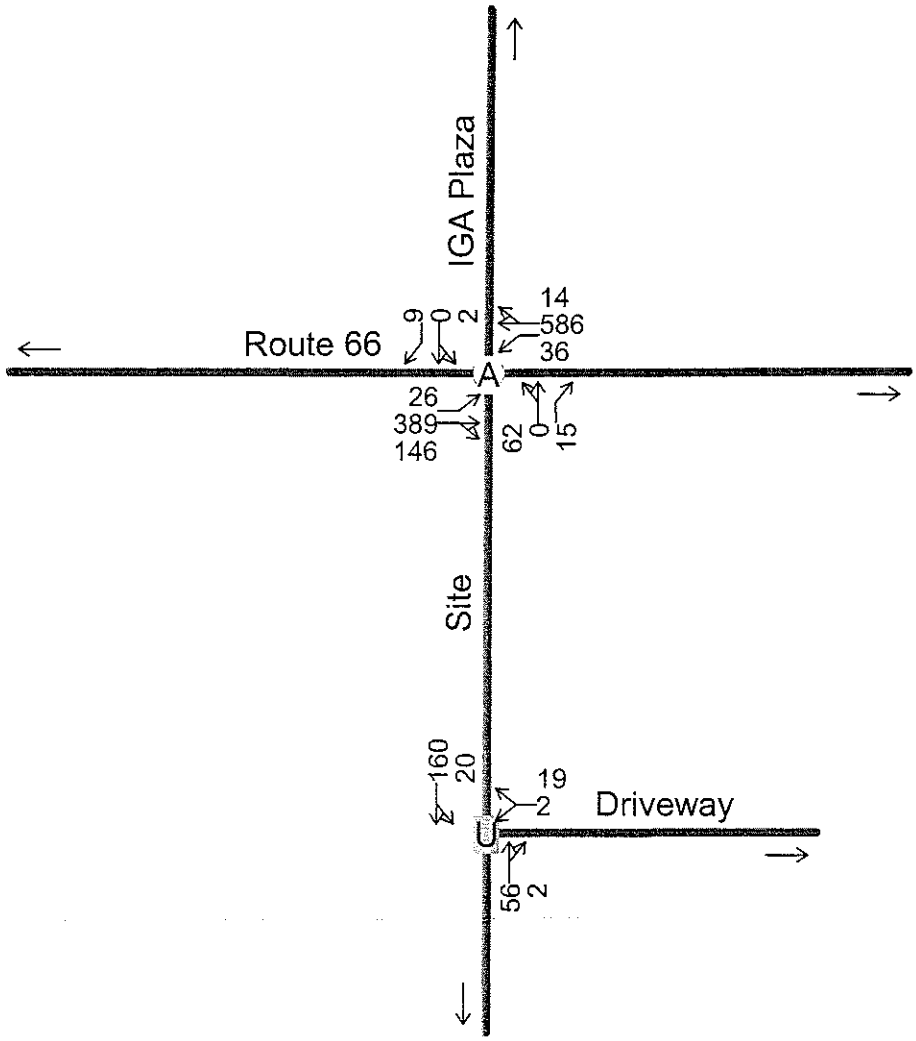
T:\pf\02225\jcelc144 lt1

Table 4R
Site Generated Traffic
Hebron Village

Land Use	Size	Units	ADT	AM Peak Hour Enter	AM Peak Hour Exit	AM Peak Hour Total	PM Peak Hour Enter	PM Peak Hour Exit	PM Peak Hour Total	Saturday Peak Hour Enter	Saturday Peak Hour Exit	Saturday Peak Hour Total
Phase 1												
Health Club	35,000	s.f.	1,153	18	24	42	72	70	142	46	45	91
Office	75,000	s.f.	925	116	16	132	22	103	125	14	12	26
General Retail	25,000	s.f.	1826	26	16	42	80	88	168	121	111	232
Restaurant	3,250	s.f.	476	22	21	43	25	16	41	47	28	75
Total	**138,250**	**s.f.**	**4,380**	**182**	**77**	**259**	**199**	**277**	**476**	**228**	**196**	**424**
Phase 2												
Residential	6	units	60	5	1	6	2	4	6	3	3	6
Phase 3												
Office	75,000	s.f.	925	116	16	132	22	103	125	14	12	26
General Retail	25,000	s.f.	1826	26	16	42	80	88	168	121	111	232
Supermarket	35,000	s.f.	3,735	62	40	102	208	199	407	227	219	446
Restaurant	3,250	s.f.	476	22	21	43	25	16	41	47	28	75
Total	**142,000**	**s.f.**	**6,962**	**226**	**93**	**319**	**335**	**406**	**741**	**409**	**370**	**779**
Phase 4												
Appartments	46	units	982	9	28	37	31	18	49	25	21	46
Phase 5												
Residential	71	units	1,258	15	43	58	48	26	74	37	31	68
Phase 6												
Light Industry	75,000	s.f.	523	61	8	69	9	65	74	6	5	11

Table 7R
Level of Service Summary

Intersection	Peak Hour		2010 Combined with Improvements LOS	delay
Route 66 @ IGA Plaza and Site Access Road	AM Peak		A	9.2
	PM Peak		C	22.7
	SAT Peak		B	12.2
Site Access Road @ Site Driveway	AM Peak			
		westbound	A	9.0
		southbound left	A	0.9
	PM Peak			
		westbound	B	10.4
		southbound left	A	1.0
	SAT Peak			
		westbound	A	9.8
		southbound left	A	1.7


IGA Plaza
Route 66
Site
Driveway
A
C
9
0
2
14
586
36
26
389
146
62
0
15
160
20
19
2
56
2

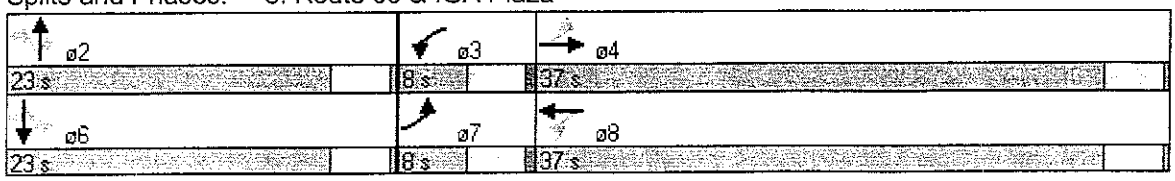
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.959			0.997				0.850			0.850
Flt Protected	0.950			0.950				0.950			0.950	
Satd. Flow (prot)	1770	1786	0	1770	1857	0	0	1770	1583	0	1770	1583
Flt Permitted	0.216			0.273				0.757			0.713	
Satd. Flow (perm)	402	1786	0	509	1857	0	0	1410	1583	0	1328	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			2				16			10
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2108			1852			2036			1602	
Travel Time (s)		47.9			42.1			46.3			36.4	
Volume (vph)	26	389	146	36	586	14	62	0	15	2	0	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	423	159	39	637	15	67	0	16	2	0	10
Lane Group Flow (vph)	28	582	0	39	652	0	0	67	16	0	2	10
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	7	4		3	8		2	2	2	6	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		8.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	8.0	37.0	0.0	8.0	37.0	0.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	11.8%	54.4%	0.0%	11.8%	54.4%	0.0%	33.8%	33.8%	33.8%	33.8%	33.8%	33.8%
Maximum Green (s)	4.0	33.0		4.0	33.0		19.0	19.0	19.0	19.0	19.0	19.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	18.8	18.0		19.6	19.2			8.0	8.0		8.0	8.0
Actuated g/C Ratio	0.43	0.48		0.46	0.51			0.21	0.21		0.21	0.21
v/c Ratio	0.09	0.66		0.11	0.68			0.22	0.05		0.01	0.03
Control Delay	5.4	9.1		4.7	8.8			17.5	10.5		18.0	11.3
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	5.4	9.1		4.7	8.8			17.5	10.5		18.0	11.3
LOS	A	A		A	A			B	B		B	B
Approach Delay		9.0			8.5			16.2			12.4	
Approach LOS		A			A			B			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	4.0	33.0		4.0	33.0		11.5	11.5	11.5	11.5	11.5	11.5
90th %ile Term Code	Max	Hold		Max	Max		Gap	Gap	Gap	Hold	Hold	Hold
70th %ile Green (s)	0.0	22.8		4.0	30.8		8.7	8.7	8.7	8.7	8.7	8.7
70th %ile Term Code	Skip	Gap		Max	Hold		Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	0.0	15.8		0.0	15.8		6.8	6.8	6.8	6.8	6.8	6.8
50th %ile Term Code	Skip	Hold		Skip	Gap		Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	0.0	11.9		0.0	11.9		5.9	5.9	5.9	5.9	5.9	5.9
30th %ile Term Code	Skip	Hold		Skip	Gap		Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	0.0	9.0		0.0	9.0		5.5	5.5	5.5	5.5	5.5	5.5
10th %ile Term Code	Skip	Hold		Skip	Gap		Gap	Gap	Gap	Gap	Gap	Gap
Stops (vph)	11	312		14	349			51	8		3	6
Fuel Used(gal)	1	12		1	12			1	0		0	0
CO Emissions (g/hr)	36	805		44	815			104	22		3	12
NOx Emissions (g/hr)	7	157		9	159			20	4		1	2
VOC Emissions (g/hr)	8	186		10	189			24	5		1	3
Dilemma Vehicles (#)	0	0		0	0			0	0		0	0
Queue Length 50th (ft)	2	48		2	61			9	0		0	0
Queue Length 95th (ft)	8	203		11	249			52	14		6	11
Internal Link Dist (ft)		2028			1772			1956			1522	
Turn Bay Length (ft)												
Base Capacity (vph)	307	1164		363	1231			583	664		550	661
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.09	0.50		0.11	0.53			0.11	0.02		0.00	0.02

Intersection Summary

Area Type: Other
Cycle Length: 68
Actuated Cycle Length: 37.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 9.2 Intersection LOS: A
Intersection Capacity Utilization 48.5% ICU Level of Service A
Analysis Period (min) 15
90th %ile Actuated Cycle: 60.5
70th %ile Actuated Cycle: 47.5
50th %ile Actuated Cycle: 30.6
30th %ile Actuated Cycle: 25.8
10th %ile Actuated Cycle: 22.5

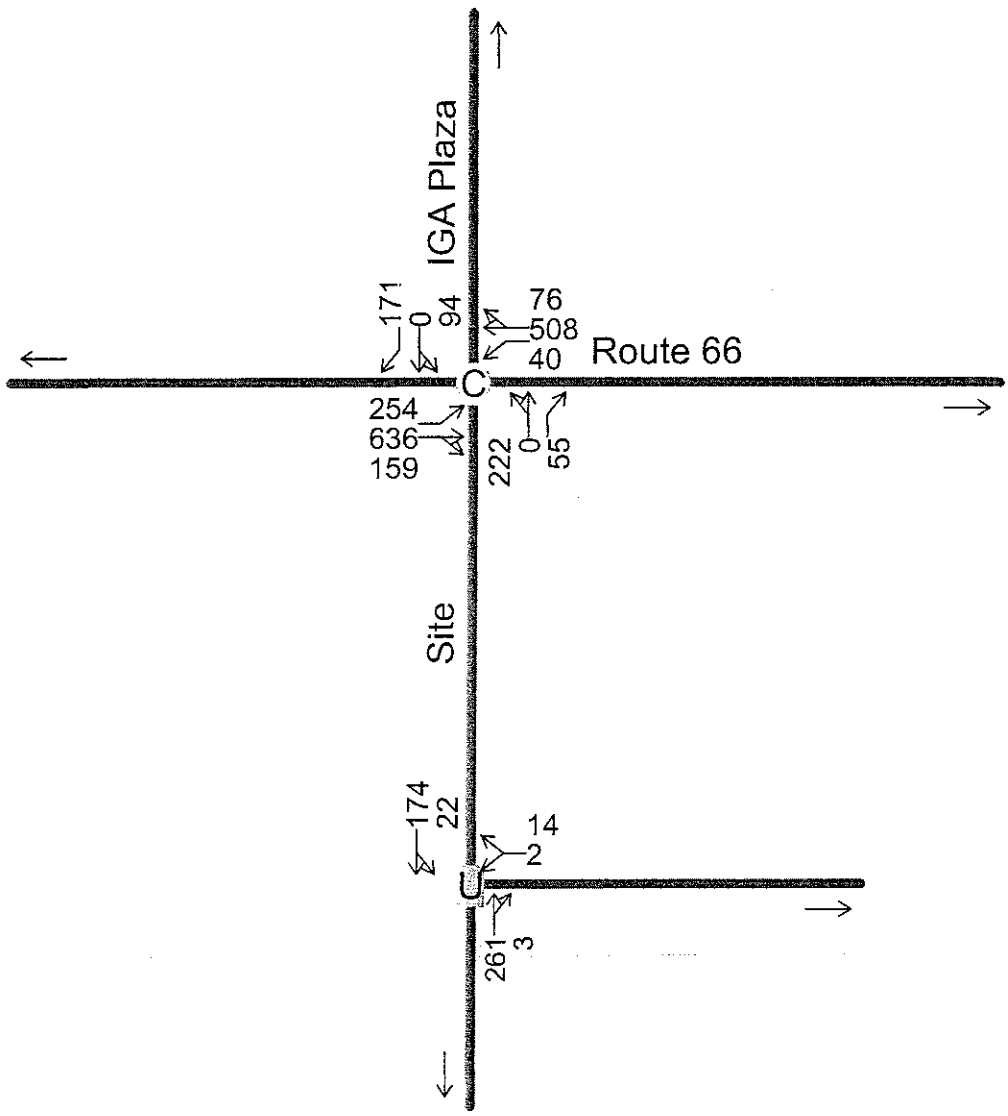
Splits and Phases: 3: Route 66 & IGA Plaza



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	2	19	56	2	20	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	21	61	2	22	174
Pedestrians			15			15
Lane Width (ft)			12.0			12.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			1			1
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	294	77			63	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	294	77			63	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			99	
cM capacity (veh/h)	678	972			1540	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	23	63	196
Volume Left	2	0	22
Volume Right	21	2	0
cSH	933	1700	1540
Volume to Capacity	0.02	0.04	0.01
Queue Length 95th (ft)	2	0	1
Control Delay (s)	9.0	0.0	0.9
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.9
Approach LOS	A		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		


IGA Plaza
Route 66
Site
171
0
94
76
508
40
254
636
159
222
0
55
174
22
14
2
261
3

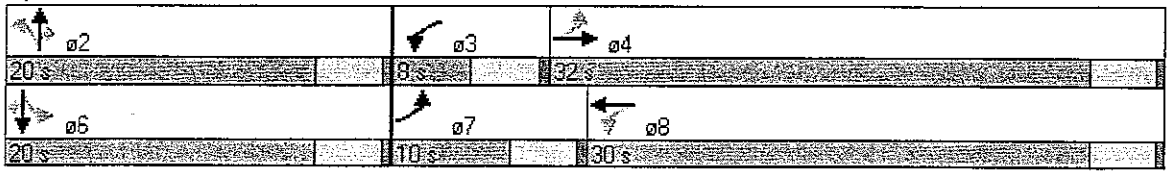
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.980				0.850			0.850
Flt Protected	0.950			0.950				0.950			0.950	
Satd. Flow (prot)	1770	1807	0	1770	1825	0	0	1770	1583	0	1770	1583
Flt Permitted	0.174			0.154				0.691			0.502	
Satd. Flow (perm)	324	1807	0	287	1825	0	0	1287	1583	0	935	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			16				60			186
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1856			2111			2026			1482	
Travel Time (s)		42.2			48.0			46.0			33.7	
Volume (vph)	254	636	159	40	508	76	222	0	55	94	0	171
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	276	691	173	43	552	83	241	0	60	102	0	186
Lane Group Flow (vph)	276	864	0	43	635	0	0	241	60	0	102	186
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	7	4		3	8		2	2	2	6	6	6
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		8.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	10.0	32.0	0.0	8.0	30.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	16.7%	53.3%	0.0%	13.3%	50.0%	0.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Maximum Green (s)	6.0	28.0		4.0	26.0		16.0	16.0	16.0	16.0	16.0	16.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	32.3	30.1		26.9	22.8			13.5	13.5		13.5	13.5
Actuated g/C Ratio	0.59	0.55		0.45	0.42			0.25	0.25		0.25	0.25
v/c Ratio	0.78	0.86		0.19	0.82			0.76	0.14		0.44	0.35
Control Delay	27.5	24.9		7.9	22.1			31.0	6.3		23.2	5.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	27.5	24.9		7.9	22.1			31.0	6.3		23.2	5.2
LOS	C	C		A	C			C	A		C	A
Approach Delay		25.5			21.2			26.1			11.6	
Approach LOS		C			C			C			B	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	6.0	28.0		4.0	26.0		16.0	16.0	16.0	16.0	16.0	16.0
90th %ile Term Code	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
70th %ile Green (s)	6.0	28.0		4.0	26.0		16.0	16.0	16.0	16.0	16.0	16.0
70th %ile Term Code	Max	Max		Max	Max		Max	Max	Max	Hold	Hold	Hold
50th %ile Green (s)	6.0	36.0		0.0	26.0		16.0	16.0	16.0	16.0	16.0	16.0
50th %ile Term Code	Max	Hold		Skip	Max		Max	Max	Max	Hold	Hold	Hold
30th %ile Green (s)	6.0	29.3		0.0	19.3		12.4	12.4	12.4	12.4	12.4	12.4
30th %ile Term Code	Max	Hold		Skip	Gap		Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	6.0	27.4		0.0	17.4		8.0	8.0	8.0	8.0	8.0	8.0
10th %ile Term Code	Max	Gap		Skip	Hold		Gap	Gap	Gap	Hold	Hold	Hold
Stops (vph)	102	506		20	452			182	14		76	27
Fuel Used(gal)	6	18		1	15			6	1		2	2
CO Emissions (g/hr)	396	1281		58	1030			413	71		136	161
NOx Emissions (g/hr)	77	249		11	200			80	14		27	31
VOC Emissions (g/hr)	92	297		13	239			96	16		32	37
Dilemma Vehicles (#)	0	0		0	0			0	0		0	0
Queue Length 50th (ft)	41	198		6	183			78	0		30	0
Queue Length 95th (ft)	#154	#535		15	#356			#174	23		71	40
Internal Link Dist (ft)		1776			2031			1946			1402	
Turn Bay Length (ft)												
Base Capacity (vph)	353	1010		230	834			363	490		264	581
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.78	0.86		0.19	0.76			0.66	0.12		0.39	0.32

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 54.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 22.7 Intersection LOS: C
Intersection Capacity Utilization 75.4% ICU Level of Service D
Analysis Period (min) 15
90th %ile Actuated Cycle: 60
70th %ile Actuated Cycle: 60
50th %ile Actuated Cycle: 60
30th %ile Actuated Cycle: 49.7
10th %ile Actuated Cycle: 43.4
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

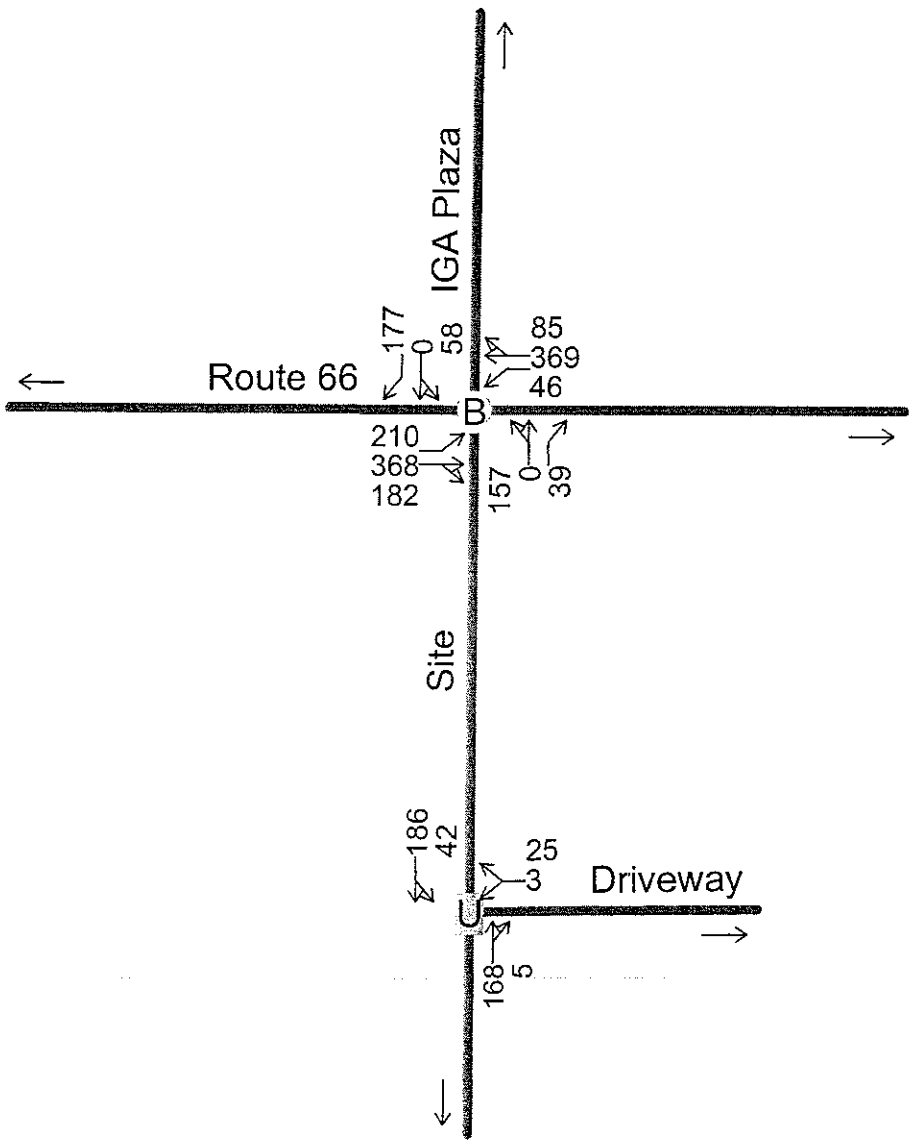
Splits and Phases: 3: Route 66 & IGA Plaza



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	2	14	261	3	22	174
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	15	284	3	24	189
Pedestrians			15			15
Lane Width (ft)			12.0			12.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			1			1
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	537	300			287	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	537	300			287	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			98	
cM capacity (veh/h)	489	730			1275	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	17	287	213
Volume Left	2	0	24
Volume Right	15	3	0
cSH	688	1700	1275
Volume to Capacity	0.03	0.17	0.02
Queue Length 95th (ft)	2	0	1
Control Delay (s)	10.4	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	10.4	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		


IGA Plaza
Route 66
Site
Driveway
177
0
58
85
369
46
210
368
182
157
0
39
186
42
25
3
168
5

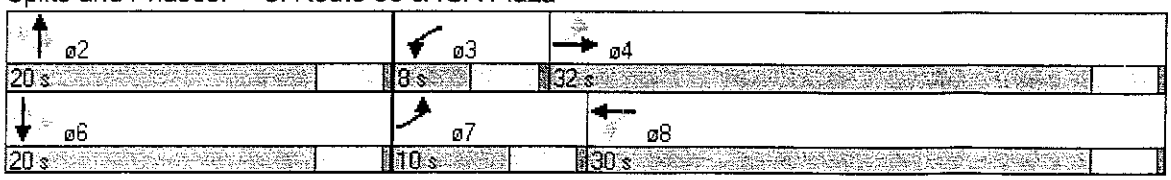
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	4 0	4 0	4 0	4 0	4 0	4 0	4 0	4 0	4 0	4 0	4 0	4 0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
Frt		0 950			0 972				0 850			0 850
Flt Protected	0 950			0 950				0 950			0 950	
Satd Flow (prot)	1770	1770	0	1770	1811	0	0	1770	1583	0	1770	1583
Flt Permitted	0 296			0 271				0 716			0 624	
Satd Flow (perm)	551	1770	0	505	1811	0	0	1334	1583	0	1162	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd Flow (RTOR)		56			24				42			192
Headway Factor	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00	1 00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1875			1725			2026			1594	
Travel Time (s)		42 6			39 2			46 0			36 2	
Volume (vph)	210	368	182	46	369	85	157	0	39	58	0	177
Peak Hour Factor	0 92	0 92	0 92	0 92	0 92	0 92	0 92	0 92	0 92	0 92	0 92	0 92
Adj. Flow (vph)	228	400	198	50	401	92	171	0	42	63	0	192
Lane Group Flow (vph)	228	598	0	50	493	0	0	171	42	0	63	192
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phases	7	4		3	8		2	2	2	6	6	6
Minimum Initial (s)	4 0	4 0		4 0	4 0		4 0	4 0	4 0	4 0	4 0	4 0
Minimum Split (s)	8 0	20 0		8 0	20 0		20 0	20 0	20 0	20 0	20 0	20 0
Total Split (s)	10 0	32 0	0 0	8 0	30 0	0 0	20 0	20 0	20 0	20 0	20 0	20 0
Total Split (%)	16 7%	53 3%	0 0%	13 3%	50 0%	0 0%	33 3%	33 3%	33 3%	33 3%	33 3%	33 3%
Maximum Green (s)	6 0	28 0		4 0	26 0		16 0	16 0	16 0	16 0	16 0	16 0
Yellow Time (s)	3 5	3 5		3 5	3 5		3 5	3 5	3 5	3 5	3 5	3 5
All-Red Time (s)	0 5	0 5		0 5	0 5		0 5	0 5	0 5	0 5	0 5	0 5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3 0	3 0		3 0	3 0		3 0	3 0	3 0	3 0	3 0	3 0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		5 0			5 0		5 0	5 0	5 0	5 0	5 0	5 0
Flash Dont Walk (s)		11 0			11 0		11 0	11 0	11 0	11 0	11 0	11 0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	23 9	22 1		20 0	17 3			11 1	11 1		11 1	11 1
Actuated g/C Ratio	0 51	0 49		0 40	0 39			0 25	0 25		0 25	0 25
v/c Ratio	0 51	0 66		0 16	0 69			0 52	0 10		0 22	0 36
Control Delay	9 6	11 7		6 9	14 4			20 3	6 9		17 6	4 8
Queue Delay	0 0	0 0		0 0	0 0			0 0	0 0		0 0	0 0
Total Delay	9 6	11 7		6 9	14 4			20 3	6 9		17 6	4 8
LOS	A	B		A	B			C	A		B	A
Approach Delay		11 1			13 8			17 7			8 0	
Approach LOS		B			B			B			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
90th %ile Green (s)	6.0	28.0		4.0	26.0		16.0	16.0	16.0	16.0	16.0	16.0
90th %ile Term Code	Max	Max		Max	Max		Max	Max	Max	Hold	Hold	Hold
70th %ile Green (s)	6.0	26.4		4.0	24.4		14.7	14.7	14.7	14.7	14.7	14.7
70th %ile Term Code	Max	Gap		Max	Hold		Gap	Gap	Gap	Hold	Hold	Hold
50th %ile Green (s)	6.0	26.8		0.0	16.8		11.0	11.0	11.0	11.0	11.0	11.0
50th %ile Term Code	Max	Hold		Skip	Gap		Gap	Gap	Gap	Hold	Hold	Hold
30th %ile Green (s)	6.0	22.7		0.0	12.7		8.4	8.4	8.4	8.4	8.4	8.4
30th %ile Term Code	Max	Hold		Skip	Gap		Gap	Gap	Gap	Hold	Hold	Hold
10th %ile Green (s)	0.0	8.2		0.0	8.2		5.6	5.6	5.6	5.6	5.6	5.6
10th %ile Term Code	Skip	Gap		Skip	Hold		Gap	Gap	Gap	Hold	Hold	Hold
Stops (vph)	89	334		22	320			124	12		44	29
Fuel Used(gal)	4	11		1	9			4	1		1	3
CO Emissions (g/hr)	278	782		56	644			267	52		82	177
NOx Emissions (g/hr)	54	152		11	125			52	10		16	34
VOC Emissions (g/hr)	64	181		13	149			62	12		19	41
Dilemma Vehicles (#)	0	0		0	0			0	0		0	0
Queue Length 50th (ft)	24	71		5	102			39	0		13	0
Queue Length 95th (ft)	60	252		17	212			104	20		45	41
Internal Link Dist (ft)		1795			1645			1946			1514	
Turn Bay Length (ft)												
Base Capacity (vph)	447	1031		312	918			452	564		394	664
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.51	0.58		0.16	0.54			0.38	0.07		0.16	0.29

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 44.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 12.2 Intersection LOS: B
Intersection Capacity Utilization 61.6% ICU Level of Service B
Analysis Period (min) 15
90th %ile Actuated Cycle: 60
70th %ile Actuated Cycle: 57.1
50th %ile Actuated Cycle: 45.8
30th %ile Actuated Cycle: 39.1
10th %ile Actuated Cycle: 21.8

Splits and Phases: 3: Route 66 & IGA Plaza



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	3	25	168	5	42	186
Peak Hour Factor	0 92	0 92	0 92	0.92	0 92	0 92
Hourly flow rate (vph)	3	27	183	5	46	202
Pedestrians			15			15
Lane Width (ft)			12.0			12.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			1			1
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	494	200			188	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	494	200			188	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3 5	3.3			2.2	
p0 queue free %	99	97			97	
cM capacity (veh/h)	511	830			1386	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	30	188	248
Volume Left	3	0	46
Volume Right	27	5	0
cSH	778	1700	1386
Volume to Capacity	0 04	0.11	0 03
Queue Length 95th (ft)	3	0	3
Control Delay (s)	9.8	0 0	1 7
Lane LOS	A		A
Approach Delay (s)	9 8	0 0	1.7
Approach LOS	A		

Intersection Summary			
Average Delay	1 5		
Intersection Capacity Utilization	40 9%	ICU Level of Service	A
Analysis Period (min)	15		